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COFFEE GROWING IN PERU

IS once more engaging attention: *Engineering* of August 21st has an interesting paper with "Estimates" referring to coffee planting in the valleys of the Chanchamayo and Perené, about which, a great deal can be learned in "Old Colonist"'s book. I send you the paper for reproduction. "Old Colonist" will especially agree with the writer in describing Peru as one of the most favoured of countries in natural resources and climate—and only wanting an able Governor —a "Porfirio Dias" who has done so much for Mexico—to release her from being the victim of "*political jackals*"! The want of a proper labour supply is another drawback owing to the inveterate laziness of the *Cholas* (Indo-Spanish) who might do much to develope their country if they would only work. As it is, however, the estimates given for coffee gardens—on a small scale, however—shew such returns as would pay back all the capital outlay in the 6th year and leave an annual income thereafter of over £800 sterling from 20,000 coffee trees covering 10 "hectares"* of a "Chacra" or coffee garden. Four weedings or clearings a year are provided for and yet the coffee trees are only given 20 years of life if kept clear of weeds! Surely with care, 40 years might be counted on.

The valleys of the Chanchamayo and Perené, which were described in *Engineering*, vol. lviii., pages 474 and 507, are developing such importance as a coffee growing region that it may be of interest to give an outline of the work of developing *chacras* in that part of the world. The following details have been gleaned from several of the persons interested in coffee culture in the Chanchamayo valley, and as all the districts on the eastern slope of the Peruvian Andes are worked in the same manner, the one illustration will apply to the whole territory.

* The hectare equals 2·471 English acres.

To claim land for the purpose of cultivating it for coffee or other produce, it is necessary to "denounce" it before the Prefect of the Department. The person requiring the land must make his own survey and send in a plan with his petition. The land is divided into lots of fifty hectares (about 123½ acres), and the smallest claim that will be entertained is for one lot. On the other hand, if more than a certain number of lots are required, the petition must be made direct to the National Government.

There is no fee required, but the "denouncements" are usually written upon stamped paper, which, although not compulsory, saves considerable trouble in the future. It is also well to know how to shake hands with the officials properly, for they can do much to smoothe the path of a land hunter and can place no end of obstacles in his way, if the interchange of animal magnetism is not carried out, through some metallic conductor, the colour of which has much to do with the intensity of the interest developed. One of the greatest impediments to the rapid development of the district is the want of official maps. The Government has utterly neglected this most important duty, and there is naturally a certain want of confidence among the people who would take up land, because they are afraid that in the future, when the boundaries have to be adjusted, the independent surveys will be found to have mixed up neighbouring properties. The Government does not even take measurements at the time of giving possession of the land to the claimant, so that the dividing lines have to be adjusted by the parties themselves. It is therefore more than probable that, as the district becomes more thickly populated, quarrels as to location of dividing lines will arise, and the lawyers will reap a rich harvest as soon as the season for litigation comes around.

Peruvians are for ever complaining of the poverty of the country, notwithstanding the fact that it is one of the most favoured in natural resources and climate. They have no one to blame but themselves. The Government at the capital is too busy fomenting or combating internal quarrels, and the interest of the people, who are really keeping the Republic alive, are relegated to the charge of tiptaking officialdom

whose combination of craft and ignorance is sufficient to ruin the richest nation on the face of the earth. When Peru finds her Porfirio Diaz as Mexico has done, she will advance, but as long as she is the victim of political jackals she cannot hope to take the position among nations that her undoubted natural wealth should give her.

The configuration of the Chanchamayo valley is admirably suited to the cultivation of coffee. On the slopes of the hills the temperature is just that required, and there is very little liability of the water lodging at the roots of the trees during the rainy season. In flat lands the humidity caused by too much moisture is detrimental to coffee plants, hence the advisability of selecting territory that has sufficient slope to insure perfect drainage. A sharp declivity is also bad, because the heavy rains cut away the subsoil rapidly and soon render the cleared hillsides sterile.

Deep soil is also necessary for the coffee plant, in order that its roots may develop to their fullest extent. For this reason the lands lying immediately on the banks of the Chanchamayo river are unsuited to the cultivation of coffee, the soil being clayey and shallow. Besides this, the low valley lands abound in ants, which would soon attack and devour all the young plants.

Water is plentiful, as can readily be understood, and it can be conducted to nearly all the hill slopes with but little trouble or expense. Therefore, while for coffee cultivation artificial irrigation is unnecessary, or, in fact, not of much value, it can be utilised for other plants, such as those used for immediate consumption; and those intending to take up lands should always keep in mind that the water will have to be used for power when the time comes to put up machinery, &c., for preparing the coffee for market. At present all the machinery in the valley of the Chanchamayo is driven by water power, of which there is an abundance in the different rivers and streams.

The rains are heavy during the months of December, January, February and March; mists known as *águaceros* are experienced in October, November, April, and May, and the other four months are completely dry: not dry as is known in England, but so dry that everything is parched up as if subjected to the heat of a great oven, the coffee plants lying solely by the moisture they are able to take up by their deep roots.

The question of labour is one that will have to be seriously faced very soon. Even now, at the very beginning of the development of the district, it has become necessary to enlist *chacra* hands in the more distant towns of Huancayo, Jauja, and Tarma, because the labour element of La Merced has thinned out considerably, and many of the workmen (?) prefer to live in a state of idleness than to do anything to help along the rising industry of coffee culture. The *cholas* (mixture of Indian and Spanish) who are brought from the towns on the sides of the mountains cannot stand the change of climate, and are for ever pining to get back to their homes again. It is really aggravating to see this human species sauntering about with their hands thrust in their pockets, totally oblivious to the fact that if they withdrew them and worked they would better themselves. They are a lazy lot, and will only work when they are captured like wild beasts and sent to the capital handcuffed, for the purpose of filling the ranks of the different regiments. Then they become abject slaves, and fight without really knowing what they are killing each other for. The sooner their generation passes away the better it will be for the country's welfare. Compared with the *chuncho*, or full-breed Indian, they are worthless as hands in clearing territory for coffee. The latter know how to use the axe and machete with great skill, and are used to work in the dense woods. However, as the *chunchos* are so few, the others are acceptable on the principle that they are better than nothing.

Their pay varies according to the distance they have to come, and ranges from 50 cents to one sol per day. There also exists a certain custom of giving them three *copas*, or drinks of *chacta*, per day. *Chacta* is a strong liquor made from the sugar cane, before which the whiskey of the Indian outposts in the States would have to retire to the list of temperance beverages. They are also provided with a place to sleep in. The food they provide themselves; but if the owner of the *chacra* engages to supply them, he deducts 25 cents per day from their money. The *chuncho*, as has been stated, are much more to be preferred as workmen when preparing the land. They are perfectly acclimated, since they inhabit the adjacent forest, and they have not that constant anxiety to go to their homes. Arrangements with one or more of them can be made to clear a certain area of land, they taking in exchange all kinds of trinkets and articles, among which the shot-gun is the most highly prized. They also require their own *copas* of *chacta*, but do not require sleeping quarters, as they go to their homes every night.

When a *chuncho* takes a contract to clear a certain piece of land, he takes his own time to do it. When he goes to work, he does not play with the axe or machete—he works hard: but he may not turn up again for a day or two. If there are any shot-guns mentioned in the contract, however, the *chuncho* knows no rest until his work is finished and he receives the coveted prize. One difficulty with them is their language. But few of them understand Spanish, and it is necessary to have an interpreter: unless, indeed, the subject discussed is *chacta*, and then they can make themselves better understood by signs than they could through the most eloquent intermediary.

Referring to their love of the shot-gun, it can be said that they know the use of it very well, and some of them would be considered fair marksmen. They are, as is natural born hunters, and make good camp suppliers if they do not take into their heads to leave for parts unknown, with the shot-gun loaded them for the purpose of hunting. One of them, who understood Spanish, was asked how he managed to bring down a *pavo del monte* (Mountain Turkey) so soon after leaving camp. He immediately went through a species of performance illustrating his crawling through the undergrowth until he saw the bird. He then sat down and gave a perfect imitation of the turkey calling its mate. He wound up the exhibition by saying "*Cara blanca* (whiteface) tries to go to Turkey. Turkey knows too much, so *cara blanca* has to travel very far, and when he makes a noise off goes the bird. I see my bird and then call him. He comes to be shot, and—boom!—down he goes. *Cara blanca es tonto.*" The latter remarks are not complimentary to the paleface, being capable of abbreviation into Anglo-Saxon monosyllables.

Taking the work of the *cholo* by day hire and that of the *chuncho* by contract, there is an appreciable difference in favour of the latter, not counting the fact that there is a saving also in the trouble of superintendence. It is therefore a great pity that their number is so small, as their service could be utilised to great advantage.

There is another way of accomplishing the work of establishing coffee *chacras*, which is adopted by those having capital and who do not wish to undertake the work of clearing and planting themselves. It is by the employment of what are known as *mejoreros*. The *mejoreros* are men to whom the lands are handed over for a term of four years. They are also given the necessary tools, and are supplied with food during the whole period. At the end of the time stated they return the *chacra* to the owner in a perfect state of cultivation, the trees being sufficiently advanced to bear their first crop The owner then pays them at the rate of 15 cents per plant, first deducting all the advances made for food, &c., nothing being omitted. A strict account of the advances is kept by both parties, and the balance is handed over to the *mejorero*.

There are some *mejoreros* who will take charge of the land for six years and not require any advances in the shape of provisions, &c., their profit being obtained from the crops between the fourth and sixth years. This, as can be imagined, is a good arrangement for the *mejorero*, as he will receive a large sum from the sale of the coffee. It would naturally be supposed that those men would open up their own *chacras* and permanently enjoy the fruits of their labour, but very seldom is this the case. When they have a number of *chacras* on hand, the deductions on account of provisions, &c., are very small, and they then make a handsome profit.

From an economical point of view, the employment of *mejoreros* appears much the cheaper way of obtaining a fully developed *chacra* with the least amount of attention; but it also has its drawbacks, due in the main part to the instability of the people with whom one has to deal. The operations necessary to prepare the land for the cultivation of coffee are as follows: First, the *rocc* or felling of trees and cutting away of the undergrowth is done. This is the most laborious work, and needs men that not only know the use of the axe and machéte, but also those accustomed to working where there are numerous venomous snakes and insects. The *chaupco*, or cutting up the branches and preparing the brush for firing, is then gone through. When the dry months set in, and everything is like tinder, the fire is applied and the whole area well burned. The ground is then cleared and the *calles* or streets formed, so that the plants can be located at equal distance from one another in regular order.

There are usually a large number of tree trunks left unburned, and these have to be cleared away, and also the roots extracted where necessary. The number of men employed will depend entirely upon the area it is proposed to put under cultivation, and it is difficult to figure with any degree of approximation the amount of labour that can be counted upon from the *cholas*. Their willingness to work is in inverse ratio to the cube of their capacity to absorb *chacta* and sleep.

As the burning can only be carried on during the dry months, the work of clearing generally extends over the whole year; but that time is not lost, because the young plants are maturing in their nursery in the meantime.

Taking 50 cents per day as a basis for labour, the estimates of the different processes would be:

	Soles.
Rocc and *chaupco* per hectare (about 2½ acres)	65
Burning the rubbish	12
Making streets in which to plant the young trees	25

(The gold value of the sole is 2s. 2d.)

When the above operations are performed, the land is ready for the *almacigo*, or transplanting the young trees. It is not customary to sow the seeds direct first because one year would be lost and secondly, as the fruit contains two seeds, the sprouts would have to be separated when they had developed, a process that would disturb and perhaps destroy the roots of the plant left standing. The seeds are therefore sown in a selected piece of ground before the clearing of the land is started, and the plants are ready, as has been stated, by the time that work is finished. The seed should be planted where there is no shade, because if the young plants are developed under the cover of the branches of other trees, they must be placed in a similar position when transplanted, otherwise they will suffer from the change to the light and direct rays of the sun. The distance generally fixed between the trees in the *streets* is 2 metres, so that each hectáre will contain 2,000 plants.

The seed is the cherry, which contains two beans, each of which develops into a plant. These can be purchased at the rate of ten soles per quintal (21s 8d per 100 lb.). The expense of the nursery is very small, as the seeds are sown close together until the time for transplanting arrives. It is usually estimated that the plants cost one cent each. The transplanting is done at the beginning of the rainy season, that is in November or the early part of December, and is a delicate operation, as the young shoots are very tender and will not stand much handling or rough usage.

The grounds, when planted, need four cleanings per year, which is estimated at 40 soles per hectáre per annum. The harvest time commences in April and concludes about the end of August. The cost of collecting the fruit and preparing the coffee for the market averages about 80 cents for quintal (10½d. per 100 lb.), the machinery, tanks, &c., being considered in the general estimate.

The first crop of coffee is taken in the fourth year, and averages 1½ lb. per tree. After that the average of 2 lb. may be considered a fair one, as in some years they give less and in others much more.

After being cleaned, the coffee of this particular district holds good for about three months, after which it begins to bleach and get parched. It is therefore necessary to ship it at once to market. The prices paid in La Merced, at present, vary between 26 and 28 soles per quintal (Spanish), but it is best to place the figure at 26 soles for the purpose of estimating. The cost of production may be stated at 12 soles, without reckoning interest on the capital. The life of a tree is about 20 years, that is, if it is constantly attended and kept clear of weeds, &c.

Taking 10 hectáres as a *chacra* containing 20,000 trees, it will be seen how much expense is necessary to put it under cultivation, and how much profit there will be in five years, by the following estimates, which are based upon the practice of the district:—

	Soles.
Rocc and chaupco 10 hectares at 65 soles	650.00
Burning ,, 12 ,,	120.00
"Street" making ,, 25 ,,	250.00
Cultivating and transplanting 20,000 plants at 1c	200,000
Cleaning land, &c., four years at 40 soles	1,600.0C
Harvesting and preparing 700 quintals at 80c.	560.00
Construction of house	100.00
Tools, &c.	200.00
Construction and repair of roads ..	250.00
Maintenance, five years at 35 soles per month	2100.00
	6030.00

Dividing the invested capital into four parts, and considering it at simple interest of 18 per cent. (the present bank rate):

	S.	S
Interest on first portion ..	1507.50 =	271.35
,, second ,, ..	3286.35 =	591.54
,, third ,, ..	5385.39 =	969.37
,, fourth ,, ..	7862.26 =	1415.20
Total interests		3247.46
Capital		6030.00
		9277.46

	Quintals.
Product of 20,000 plants at 1½ lb., fourth year	= 300
Product of 20,000 plants at 2 lb., fifth year	= 400
	700

	S.
700 quintals at 26s. ..	= 18,200·00
Capital and interest ..	= 9,277·46
Net profit ..	8,922·54

For the years following the fifth the annual figures would be as follows:—

	S.
Cleaning (weeding) land ..	400·00
Harvesting, &c., 400 quintals at 80c.	320 00
Tools, &c.	25·00
Road repairing	50·00
Maintenance	420·00
	1215·00
Interest at 18 per cent. ..	218·70
	1433·70
Product of 20,000 plants at 2 lb. =	S
400 quintals at 26s.	10,400.00
Total expense for one year ..	1,433,70
Profit	8,966.00

It will now be seen that by employing the *mejorero's* services there is a large saving, for they will have to pay the latter 3,000s. for 20,000 plants in their third year, and will not have all the expense stated in the above estimate.

Contracting the land out of his possession after six years would mean that the *mejorero* obtains a large profit, for the expenses would be 10,711.16s., while the receipts for coffee would reach 28,600.00, showing a clear profit of 17,888.84 soles.

The sale of the coffee at a La Merced is practically compulsory, because there the people have facilities of sending it on mule-back to Tarma, or to Arroya, where it is transferred to the train for shipment to Callao. To endeavour to send the coffee direct to the shipping port would under the present circumstances be simple madness, as the competition of the carriers would soon ruin any one who made the attempt, unless he was backed by plenty of capital. It is sad to see a territory so rich utterly neglected by a Government that is striving to keep its head above the sea of financial difficulties in which Peru has been drifting. Nothing has been done to improve the means of communication with the outer world, and therefore there are no inducements offered to people to go and take advantage of the resources that lie within a comparatively short distance of the coast line. The district is developing, it is true, but it is doing so against all the drawbacks that could possibly be encountered: an indifferent Government playing into the hands of those who place obstacles in the way of advancement, in order to reap all the benefits of the labour of others.

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(To be concluded).

CARDAMOMS IN COORG.

The Cardamom cultivated in Coorg is the *Elettaria Cardamomum*, and although the trade, so far as native cured fruit is concerned, is steadily falling, still the cardamom is an important article to the people and is certainly the cause of much thought and anxiety to the Administrators of this little Province.

I will not give any botanical description of the cardamom in this article nor will I refer to the other kinds which are not utilised, but endeavour to give an idea of the habitat of the plant and the methods of curing it followed by the people, with a few remarks on the state of the cardamom trade.

The cardamom grows best on the Western and Northern slopes of the ghats at an elevation of from 3,000 to 5,000 feet above the sea. Here the full burst of the monsoon strikes the steep sides of the hills and the rainfall reaches as much as 300 inches in some parts. It grows spontaneously but is one of those peculiar plants, the seed of which lies dormant till induced to germinate by the occurrence of certain conditions. One of these is the admission of light. Cardamoms will only be found in the dence evergreen forest, and the ordinary method of inducing them to appear is to open a small space in the forest by felling one or two very large trees. Not only does this admit the light but the fall of the trees shakes the ground and breaks the surface. So thoroughly is the necessity for the shaking of the ground believed in, that when a plot is selected, all undergrowth, small trees, &c. which might interfere with or break the fall of the gaint selected for destruction, are cleared away so that the tree may descend with all its weight and momentum: and to intensify the effect the tree is always felled so as to face down hill. As these plots are almost

invariably situated on the steepest hills, the effect of the fall of one of the enormous trees so common in the Ghat Forests must be very grand.

A Cardamom Estate is called a "male" and the ordinary method of cultivaitng a "male" among the Coorg, is to open out a certain number of these plots within the limits of the same. The plots are necessarily small, for only a limited amount of light is required and a plot too large, in addition to admitting too much light, would also allow of evaporation from the soil to an injurious extent. In the leases given for "males", the maximum size of each plot is fixed at one-sixth of an acre and at least thirty feet of forest must be left between any two plots. As a rule not more than two trees are felled and oftener only one. The felling generally takes place in February or March in the year and by the rains the young plants shoot up. They require weeding at least once before they begin to yield, which takes place in the third year. The plant continues to bear for seven or eight years, the fourth and fifth and sixth of its age being its best. When it begins to cease bearing, either a new plot is selected or another tree is felled which seems to give a fresh start to the plant.

The position of these "males" is generally so remote and inaccessible that the picking of the crop is undoubtedly no easy task. In fact, the Coorgs lose a large proportion of the crop, for the fruit begins to ripen as early as July, while they never attempt to pick before well into September. The tremendous rainfall not only, in itself, deters them from penetrating the hills, but renders the numerous streams and torrents impassable. Indeed, on the exposed slopes of the Ghats, life would scarcely be liveable in the height of the monsoon. As it is, the leeches in these forests throughout the autumn and cold weather months must be seen to be appreciated, and in addition to these drawbacks, the steepness of the hills is such that walking is difficult. When climbing about these "males" one can quite comprehend the feelings of a fly walking of the side of a house.

The cardamoms are picked and sun-dried. If the male is far from the village, the drying takes places on the spot, otherwise the capsules are taken home. Four days sunning is sufficient, care being taken that they do not get wet and that they are not over exposed, as this latter would cause the capsules to burst. But beyond this open air drying, no further curing takes place. The fruit stalks are rubbed or picked off. In this part of the process, it is wonderful the number of capsules a practised hand will clean in any given time. The capsules are then assorted according to size and colour and stored away till disposed of. But a better system of both cultivation and curing has been introduced into Coorg by an English planter in the ghats. I am much indebted to Mr. Finlayson for his having put at my disposal the necessary information concerning his treatment of cardamoms. In the first place, the cardamom plant is raised from seed in a nursery and the plants are put out in a compact plantation, instead of being allowed to grow spontaneously in scattered clearings. The first step is to prepare the area which is to be made into a cardamom plantation. This is done by thinning the shade. The amount of thinning can only be determined on the spot and is guided by experience. The aspect chosen is generally North or North West and the most favourable places are the moist hollows and ravines. The undergrowth is cleared, and planting is done in June and July, from nursery plants raised from seed, supplemented by bulbs from old stools, Mr. Finlayson prefers the latter as growing better. The plants are put out at 7 feet by 7 feet, not deep in the soil. The plants are put into shallow pits which have been filled with surface mould, the soil is pressed round the half exposed bulb and the plant tied to a stake.

These Cardamoms yield a small crop the third year after being put out and they do not come into full bearing until the fifth year, thus there is no advantage in time in this method of cultivation. The yield then is about half a seer to each plant. Thus an acre would give about 475 seers, or say 950 pounds; under half a ton. The picking lasts from July to January, September and December being the busiest months. The first crop always yields the largest fruit.

Before preceeding to give Mr. Finlayson's method of curing, I will venture on a comparison of the advantages resulting from the two systems of cultivation, the native one by means of isolated and scattered openings in the forest, and the English one of a regular plantation. As to the former, the only advantage that can be claimed, and I am not certain that the claim should be allowed—is that it does less harm to the forest which, as the Ghaut Forests should be preserved for climatic reasons, is a very important point. Mr. Dickinson, whose knowledge of the conditions of cardamom cultivation owing to his personal inspection of the males and ghaut forests is unique, is in favour of the native method on the ground of less damage being done to the forest. He argues that the partial clearing of the high forest over a comparatively large area accompanied by the removal of the undergrowth, tends to set up scouring and that the soil will be all washed away. But the drawback to the native system is the difficulty of supervising the work and of enforcing the rules as to the size of the plots and the width of the belt of forest to be left between each plot, and though it is in the interest of the male holder not to open the forest to too great an extent, it is a question whether, with the low prices ruling in the cardamom market, the urgent necessity of raising a large crop will not, and does not, tempt male holders into over-felling, leaving the future to look after itself. Where a forest has been overfelled under the native system, the damage is practically irreparable. It is with very great diffidence that I differ from one so well up in the sudject as Mr. Dickinson, but I have seen both systems of cultivation and taking all the conditions obtaining, I am decidedly in favour of the English method of cultivation, as it is more easily and effectually supervised, it concentrates the damage done into a smaller area, the crop is more easily and more cheaply picked and the whole working of the estate more in accordance with science.

Mr. Finlayson dries the capsules partly by exposure to the sun and partly by artifical heat. The former is the better method, but, owing to the uncertainty of the weather, the latter, in the end, pays better. The cardamoms are bleached by exposing them to the dew for a couple of nights and then fumigating them with sulphur. Mr. Finlayson is naturally somewhat reticent as to the process his cardamoms pass through, for the supply is large and the market restricted and the competition from Ceylon, Travancore and Mysore is keen. Before packing, the capsules are carefully sorted and clipped. I am unable to give the cost of cutivating, picking and curing the cardamom under this system. It is finally packed in boxes and sent to the market.

The price of cardamoms has been steadily diminishing of late years, Rs. 14 to perhaps 'in a few instances' Rs. 18, per maund of 28 lbs., is the average selling price of native cured cardamoms. The English cured sell from Rs. 1-8-0 to Rs. 2-4-0 per lb. The system in force in the days of the Coorg Rajas as regards the disposal of cardamoms was that the whole crop was handed in to the Government, who paid the cultivators a fixed price per maund and sold the crop for itself. The price paid was from Rs. 12 to Rs. 20, per maund. This was continued after the annextion of Coorg until 1846, when the males were put up to auction and they are now leased, tenders being invited for a certain period of years. There is another class of male in Coorg the Jama male—the holders of which have a right to the produce on payment of rent which is assessed on the estimated yield.

The prospects of the native cardamom cultivators are extremely gloomy. Owing to several causes, the cultivators have been having a bad time of it lately. Falling prices, the enfranchisement of their slaves which necessities payment of labour, and bad seasons, have all combined to render it impossible for many of the lessees to pay the rent they covenanted to six years ago. So bad has been their condition that the Local Government has had to allow a large number to resign and the condition attached to the acceptance of the resignation *viz.*, the payment of all arrears, has been found difficult to enforce.

It is a matter of extreme regret that a comparatively large number of families should lose their principal means of livelihood, but it is useless for the State to endavour to oppose the laws of economics. Want of capital prevents these small male holders from cultivating and curing their cardamoms in a paying way. The outturn is so poor in quality that it necessarily fetches a very low price when the beautifully cured capsule of the English grower is competing with it, and the problem will soon work itself out with this result, that the producers of native cured cardamoms will become fewer and fewer, until the produce they put on the market only suffices for the demand. For, strange to say, despite its inferior value and condition, there is still a demand for this kind and always will be, as long as there are people who, though desirous of purchasing, can only afford to pay low prices and must therefore, porforce, put up with an inferior articlo. The slow extinction of the male holder is a serious loss to the Forest Revenue, but, I fear, go he must, and the Department must look around for some fresh source of revenue to make us the deficit.

G. H. Foster.

Indian Forester.

SILK FROM TIMBER.

Applied science is rapidly undermining tho few scraps of sentiment that are still associated with our daily life. The scents that we fondly imagine to be distilled from the sweet breathing children of Flora are in reality extracts from coal tar, and even worse. The raspberry flavour in our confectionery is a product of benzol, with a name about thirty syllablos in length; essence of pineapple is just acetate of some dreadful hydrocarbon compound. Finally, our silks and satins, once spun from the dainty gossamer of the silkworm, are henceforth to be got (paradoxically) from cotton, sawdust, timber, wood pulp, and such like unsentimental sources. The Society of Chemical industry met and gloated over this last fact the other evening. The process has already made such strides in France that many of the extra-gorgeous silks in Regent Street this season are said to be spun from liquid timber. Science is never content with equalling nature; she likes to go one better, and so the new timber silks are much more glossy than those of the ancient worm and take richer shades of (aniline) dye. It is interesting tol earn, however, that in nearly every detail of his new silk-making process the chemical engineer has simply imitated nature. The gossamer of the silkworm, the spider, and the rest of the spinning invertebrates is really nothing but a kind of natural liquid gum or varnish exuded from fine pores of microscopic aperture. If you want to see how a sticky liquid can be drawn out into threads you have only to dip a needlo into treacle or syrup, and pull it gently out again, slightly twisting the sticky thread at tho same time. Only, the sticky threads that ooze out of the spinning ducts of the silkworm are so fino that you can hardly see them without a lens, and they have the advantage of instantly drying into a delicate clastic fibre. When a considerable number of these aro twisted together wo get the well-known filament which the silkworm uses to wrap round her cocoon and the spider to weave hor web. Now the chemist has imitated this sticky fluid which is so easily drawn into microscopic threads and instantaneously dries as it escapes into the air He first of all prepares a kind of gun-cottno by treating cotton or wood-fibre with nitro-sulphuric acid, just as if he wero going to mako smokeless powder, or celluloid, or other lovely modern product. Then he stews this in cylinders for some ours with alcohol and ether, which practically converts it into collodion. The latter emerges as a sticky fluid, like thick gum. This is pumped through pipes to spinning machines, and emerges at each machine from a fine glass nipple. Each nipple answers to one of tho pores of the silkworm. Some ten or twelve delicate threads are drawn from these nipples, combined together and spun into a thread no thicker than human hair. You have now a fine tough thread composed of a sort of dried gelatine, which is somewhat akin to the nitro-gelatine employed for blasting purposes. It would never do for ladies to go about in explosive or at loast highly inflamable stuff of this sort for obvious reasons. So the "silk" is next 'de-nitrified," which puts it all right, and it is then stretched and "ironed" until it takes on even a higher gloss than the natural article. Then it is handed over as yarn to the weaver, and we need not follow its further progress, which ends in the costumor's window. All this seems to elover that one can hardly believe it. But there is the silk actually on the market. It is nearly as strong as natural silk and a great deal cheaper, although we don't suppose ladies will find the difference in their dressmaking bills. The home of this novel manufacture is at present at Besancon, in France, but they are building large mills for it in Lancashire.

To the Editor of the "Daily Graphic.'

Sir,—I have read with interest your leader on "Silk from Wood," but unless the process you refer to is very different from the last two or three patents taken out, I am afraid it will prove a fiasco. I speak from experience, having used for the last thirty-five years silk of all sorts and I maintain that it is impossible to get an artificial silk yarn out of wood pulp.

The process is very ingenious, and the results in the "yarn" are very good, and, as you say, take the dye better almost than the real article. You say "English ladies are even now adorned with artificial silk." I doubt this very much. Would you be surprised to hear that we have given sample orders months ago for this or similar yarn, and cannot get it? Not that orders are too plentiful, but that the yarn cannot, and has not, been produced in mercantile quantities.

As to the price quoted, it does not compare very favourably with silk, which, as every one knows, is at almost the very lowest point ever known. Had this patent come out about 1871-5, when silk (say Ital. Organ) was at 44s, per lb., instead of now at 17s. 6d. to 18s. 6d., it might have had a change. But, apart from the price, the main value of silk is the length of its fibre, and consequently its strength. Your ostimate of 4-5 to 5-5, weight for weight and length for length, I take to be quite out of the question. There are a great many objections to this yarn. It is practically gun-cotton. What about a lady getting her dress on fire? The fibre—if you call it fibre—is so short that when once creased the mark will always be there; and there are many other objections that perhaps only a practical manufacturer can appreciate.

I may say that personally I have no prejudice against the yarn. If it fulfils all tho objects the makers say it will I shall be only too glad to use it. But I have novor yet seen a "silk purse made out of a sow's ear."—Yours faithfully, A. Norris.
Manchester.—*Daily Graphic.*

THE LAST CINNAMON SALES.

We are glad to find from the particulars which have come to hand by the last mail of the quarterly sale held in London on the 31st ultimo, that the prices of our famous spices were fully maintained. It is more than a year now since there was a great rebound upward, mainly caused by speculation, when the lower sorts of cinnamon fetched unprecedented prices—at any rate, prices which were unheard of for 20 years at least—and even shot ahead of the finest growths, which had always commanded top prices in the London market. It was this last circumstance which placed beyond doubt that the rise in prices, of the inferior sorts certainly, was artificial, and suggested fears that the sales would be repudiated on prompt day. Whether any sales proved to be bogus on settling day or not, we have not been able to ascertain; but it was satisfactory to note that the apprehensions regarding the demoralization of the market and the violent oscillation of the pendulum backward, were not realized. If the artificial prices were not maintained at the following sale, the prices did not slip below normal; there was no throwing back on the market of lots which had secured fancy bids, with the result of disorganization and loss of confidence in the trade. On the contrary, inferior sorts made a distinct advance on the prices which had ruled for years, and this advance has been maintained since, at every subsequent sale; while the finer sorts have held their ground, if they have not shown an appreciable advance. Indeed, the present relation in prices paid for fine cinnamon and ordinary, strikes us as more natural and reasonable than that which had obtained for years, and which secured for carefully-prepared fine quills about double the price which the identical bark, not so skilfully manipulated, fetched. The conclusion we draw from the establishment of this relative position, and from the maintenance of fair prices for the commoner kinds of cinnamon, is that there is now a healthy and growing demand which keeps pace with the supply, and that long-suffering cinnamon proprietors have at last turned the corner, from which a better outlook is visible.

The quantity of spice offered for sale last month was not heavy—only 779 bales; but then the August sales are always light; and, though the figures compare badly with those for May, when the offerings were as high as 1,743 bales, they were better than those for August last year, when the quantity brought to the hammer was only 677 bales. Almost the whole quantity offered found buyers in the room, and the few bales that remained, we have little doubt, were, as usual, disposed of privately at current figures. These prices were satisfactory all round—no sort or quality showing a decline, while most qualities showed an advance. The Goluapokuna mark asserted its prescriptive right to head the list, with 1s 4d for its firsts. This is the same figure as its firsts fetched at the previous quarterly sale; but last month its fourths realized better prices than at the May sales held on 1st June. The highest qualities of Wester Seaton, Kimbulpitiya, and Mudaliyar Rajepakse's marks secured an advance of a penny, and the advanee was maintained in the lower qualities; so that there must have been good competition for the finest growths. That is not unusual; but the maintenanee of high prices, and even an advance, for the ordinary sorts is a promising feature, and the more so as these have been offered "unworked." The tyranny of London Agents and Dock Companies, in insisting on undoing every bale and tying it up again, and charging exorbitantly for the damage done in the name of "working"—has at last been fairly overcome. For not only have common and ordinary sorts been offered and sold unworked, but also some fine spice which fetched a shilling and upwards for its firsts. It remains that the leading marks should now insist on their spice too being offered, without needless and expensive manipulation, on samples drawn from a bale of each quality. The saving should mean again of ½d to 1d a lb.; for, apart from the charge for working these, is the loss in broken cinnamon which is boxed and sold at less than the lowest qualities. We append a report on the sale from a leading firm in the trade, from which it will be seen that the stocks are very low:—

London, Sept. 2, 1896.

Cinnamon—The quarterly auctions were held on Monday last when the very small total of 779 bales Ceylon was presented, against 1,743 bales at the sales of 1st June and 667 bales at this period last year.

There was a full attendance of the trade and with good competition about 720 bales were hammered, ordinary and medium qualities realizing full last sale's prices to ½d per lb. advance, whilst fine descriptions—of which about 300 bales were catalogued—sold well, chiefly at an average rise of 1d per lb. good to fine "Firsts" at 1s to 1s 4d, "Seconds" 10d to 1s 2d, "Thirds" 10d to 1s 1d, and "Fourths" 9d to 11d per lb. The "unworked" cinnamon, fair to fine first sort brought 10d to 1s 1d, second sort 9d to 1s, Third sort 9d to 10½d, Fourth sort 9d to 9½d, and Fifth sort 8½d to 9d per lb. Only 35 bags chips in sale and sold at 3d with fair clippings at 8½d per lb.

The stock of Ceylon is 2,031 bales against 2,333 bales in 1895, 2,066 bales in 1894 and 3,707 bales in 1893.

The next auctions will be held on 30th November.

ORIGINAL RESEARCH AMONGST PLANTERS.

Almost all great inventions and discoveries have been made by members of those industries which have been thus benefited by them. Our planting industry promises to be no exception to this rule, and we have already had the singular pleasure of drawing prominent notice to the results of original research in more than one direction. We now are glad to draw attention to what promises to be some extremely valuable investigations into the intimate relation that exists between the condition of coffee soils and leaf-diseased trees. It is not our present object to dwell at length on the details of the subject, but a short summary, sketching out the lines on which these researches have been carried, will sure to be of much interest to both coffee and tea-planters, as the causes that induce disease in coffee will also be found powerful factors in the health of tea-plants.

Naturally enough any explanation of the causes of a disease that has hitherto baffled all attempts, practical and scientific, at either prevention or cure, will be first received with much doubt. And this is a very proper and scientific attitude to adopt towards all theories of a novel nature and far-reaching in their effects. Our investigator, a practical planter of some little experience, has throughout his career taken a great and absorbing interest in the scientific side of planting. Before long this gentleman, whose name

we are not just now in a position to disclose, became possessed of a number of representative analyses of the soils of the different coffee districts of South India. Having had some experience with scientific English agriculture, the marked difference between the nature of the Indian and English soils at once struck his attention. Apart from the fact, now generally known, of their great poverty in plant-food, he noted that almost one and all were also markedly deficient in the property of allowing the free passage of atmospheric air within their pores. Nor was this difficult to understand, as the proportion of their harmful iron and alumina constituents was unusally great. The importance of this may not be at first sight apparent to the ordinary reader, but it is simple enough in reality. The roots of plants cannot thrive without a free supply of oxygen; and in fact, experiments have demonstrated beyond question that oxygen is an essential of the life of plant-roots; deprived of this element, they invariably die, though furnished with abundance of all other necessaries to their well-being. Now there are certain forms of iron that have a great affinity for oxygen, and it is in this harmful form that by far the greater proportion of the iron in our coffee soils is found. To put it plainly, the iron in our soils is unrusted, and until it has rusted is naturally a great absorber of oxygen. For, as everyone knows, rust is merely a combination of iron and oxygen. Here it will be seen that we have two rivals for oxygen in the soil: the plant roots and the unrusted iron, and the metal being the stronger of the two, the roots are starved of their great essential and consequently the plant cannot thrive. Thus far it is very clear and simple, but the matter does not end here. Another essential to plant life is nitrogen, and it is well known that this element cannot be taken up, except by legumes, in its free state. The manner in which such plants as coffee take it up is in the ready digested form of nitrates. Nitrates are formed by the action of certain bacteria which live in the soil, nitrates being the vegetable matter in the soil that has (after passing through certain processes) been absorbed by them and passed out in the ordinary course of nature. These bacteria are living organisms and they cannot do without oxygen. It is easy to see, therefore, that in soils where large quantities of unrusted iron take up the bulk of the oxygen these unhappy bacteria cannot thrive, and naturally can do but very little to convert the dead nitrogenous matter into food available to plants. In agriculture at home this has been recognised for ages past, and through tillage has got to be looked upon as one of the first essentials to achieve success. The conditions that obtain in plantation culture unhappily do not allow this to be carried out with any attempt at completeness, so that the malign influences of the airless soils are left almost unchecked. This is not all. The valuable nitrates are, as we all know, extremely soluble, and therefore are washed out of the soil in huge quantities by every heavy rain. Now iron in its unrusted form effects a combination with nitrates that is especially soluble and liable to be easily carried away by rain. But when duly exposed to the air and sufficiently rusted it forms a combination that can resist in great measure the washing effects of even tropical rainfall.

Knowing all this—which has been set forth here for those unfamiliar with the subject—our investigator fell to considering the matter further. If these soils can neither manufacture nor retain nitrates in sufficient quantities, the coffee growing therein must suffer from want of nitrogen. If so, the analysis of the sap would undoubtedly show this. Analyses were therefore made of sap from trees grown respectively in soils poor in air and consequently in nitrates, and also from trees grown in rich well-aerated soils. The results were striking. In the first case, the analysis revealed a woeful deficiency in the necessary compounds of nitrogen; in the latter an abundance of these indispensable constituents was found. To be successful in its attacks, disease must, as a very general rule, find assistance in the weakened constitution of its victim. Coffee trees whose sap is poor in nitrogen are, and must be, deficient in vital power, consequently easy victims to the fell approaches of the germs of leat-disease. To support this further, the sap of leaf-diseased trees was found to be extremely poor in nitrogen, and the same state was revealed in the soils from which it was drawn. Clearly then, there is shown to be a most striking and close connection between the physical and chemical conditions of the soil and the constitution of the plants growing therein, and therefore between the soil and leaf-disease.

To sum up briefly, leaf-disease attacks weakened and unhealthy trees (as shown by after-effects of heavy cropping) far more severely than those of a robust and vigorous constitution. Coffee cannot remain in full vigour without an abundance of nitro-carbons in its sap. These compounds of nitrogen must be derived from nitrates in the soil. Nitrates cannot be formed without the action of bacteria on vegetable matter in the soil. These bacteria cannot thrive without an abundance of oxygen. The majority of our Indian coffee soils contain a very large proportion of unrusted iron, which is a most greedy absorber of oxygen. To reverse the argument. Naturally the want of oxygen results in a lack of bacteria; without bacteria nitrates cannot be formed; owing to lack of nitrates the sap of the coffee tree is deficient in nitro-carbons; as a result of this again the vigour of the tree is impaired, and thus can present no effectual resistance to the attacks of the everpresent germs of leaf-disease. —Q. E. D.

Such is, in brief, the theory of the relation between assimilable nitrogen and leaf-disease, which we hope very shortly to publish in all detail. Some of our practical readers may demur at the importance we have attached to the above: what benefit can be derived from knowing the cause of the disease without being told the cure? Let these doubters be patient: on the correct diagnosis of a disease depends altogether the success of the treatment applied. Once the true cause of leaf-disease is fully demonstrated, the cure will follow as a matter of course and certainty.—*Planting Opinion*, Sept. 12.

PROSPECTS OF INDIAN TEA.

The rapid strides that have recently been made in the consumption of Indian tea in America and Australia would seem to justify the assumption that the conversion of our cousins to a taste for our teas will not take a tithe of the time which elapsed ere the average of 5lb. per head of the population of Great Britain was reached. It must be remembered that, with the exception of the outturn of the Assam Company, no Indian teas worth mentioning were put upon the London market until 1862, and certainly they were not calculated to recommend themselves to

public favour. Scarcely two factories pursued the same method of manufacture, in consequence of which there was so little uniformity that the dealers and brokers were in despair, and it was not until 1866 that Indians really began to attract attention in Mincing Lane, but for the subsequent three years dealers purchased Indians merely for blending with the lower class of Chinas. From 1869 a demand gradually arose for the unadulterated article, from which time home consumption has steadily increased; and, though there is a considerable section of the public who still cling to the higher class of Chinas, such as that vended by Twinings, Newman and other well known houses, even they are gradually veering round in favour of Indians. We may take it for granted therefore that within the next two years the demand for Great Britain alone, reckoning on the last census, will amount to 185 million pounds. Next in order of tea-drinking nations comes Russia, but as the upper and middle classes are supplied with the best Caravan tea from China, it would not be safe to calculate upon eventually securing more than one third of the population as our customers, which would give a consumption at 5lb. per head of 155 million pounds and taking the remaining population of Europe at 251 millions, reckoning at the rate of 2lb. per head, wo arrive at a demand of 812 million pounds. We place the consumption of Continental nations at 2lb., as the majority are coffee and cocoa drinkers. What can be done here after in the way of conversion must remain an open question, at least for the present; but we have not yet secured even the 2lb. per head be it remembered. Turning to the American Continent, we have to deal with a population of 133 millions, but at present China holds the monopoly of supplying the states on the Pacific Sea-board, leaving us about two-thirds in the Canadas and Atalantic States, which ere the end of the century is reached (if we are to judge by Mr. Blechynden), should create a demand for an additional 220 million pounds. Australasia with its 4 millions may be taken as an assured market at the extreme consumption of that of the United Kingdon, so that 20 millions will be needed for those colonies in the near future, bringing the total demand, say, within the next four years up to 1,082 million pounds, the actual outturn last season being but 135 million pounds. With regard to the population of Asia, estimated to number 854 millions, we must first deduct that of China 400 millions as also Siam, Cambodia and the Malayan Peninsula, for already tea cultivation is attracting attention in these countries, and, with an almost unlimited supply of the very best seed procurable from the Shan States and Northern Tonquin between the parallel of 22° and 30°, these will not only supply their own requirements, but eventually enter into rivalry with us. This will leave us but Persia, Central Asia and Asiatic Turkey to deal with, which may be taken at one pound per head, or 100 million pounds, which is about the estimated outturn from Ceylon, 1896-97, and therefore need not enter into our calculations. Can these possible markets be secured? We believe that to the extent we have put down they can be, but not without the most energetic and prompt measures, and money must be freely, though not necessarily extravagantly, expended in establishing agencies in every centre offering prospects of success. Presuming that the securing of this supply can be accomplished within the next four years we have now to consider what means wo have for meeting the demand. The Tea Association do not publish their revised estimate until the end of August, and as much depends upon the vagaries of the remainder of the season these estimates are not reliable there being a discrepancy last year of 3 million pounds in the August estimate and 5 millions between that made in the spring and that realised. We shall be on the safe side, therefore, if we take the outturn of Indians this season at 140 millions and Ceylons at 120, in all 260 million pounds, barely enough to meet requirements, if the American and Colonial demand is sustained at the rate of the past six months. From all we have been able to glean the extensions this year in both producing countries amounts to 30,000 acres which four years hence may bring the outturn up to about 200 million pounds against a possible requirement of 1,082 million pounds as mentioned above. We abstain from entering into such side issues as the coolie problem, box-supply freights etc., which are purely matters for the planters' and agents consideration; but have endeavoured to show what markets exist or may be created, and what the prospects are of meeting an estimated demand, taking our figures from official statistics, and merely confining our remarks to the next four years, and it seems to us that the dread of over production of Indian teas is a nightmare afflicting timid investors haunted by extreme pessimist forebodings. Sales up to date have been promising enough to indicate a successful season, dispite the grumbling indulged in at the abnormal weather experienced during the spring, and it would be a wise policy to devote a liberal portion of the forthcoming dividends to exploiting the markets we have glanced at. A careful consideration of the figures we adduce will, we think, convince most people that, so far from there being danger of over-production, the probabilities lie in the opposito direction, but action, and united action, must be taken at once so as to secure outlets, for it will require fully four years to educate Continental nations. The present growing demand has, however, to be carefully watched, for there is just the possibility that our teas are being taken, as other novelties, merely to satisfy curiosity, though our own opinion is that the patronage is genuine and will become permanent. Planters and investors may regard with equanimity the attempts of rival countries for labour is chead enough here to defy competition, except, perhaps, in S.E Asia and Java, but even there the price of labour is higher than with us. At the same time resort should be had to every possible contrivance towards minimising hand work, even in the minutest details; and a good substantial prize might be offered for a picking machine, for with this problem solved the cost of production could be brought down to some two annas. Our remarks have been suggested by the adverse criticism of the *Saturday Review* upon the launching of the Consolidated Tea and Lands Company, Limited; and, though, considering the scheme has been brought out in London, the prospectus might have entered more into details of the actual planting prospects, to those better acquainted with agricultural pursuits as pursued in India than our London contemporary or the *Madras Mail*, which endorses the views of the home paper, the enterprise promises fair enough, while the price asked for the property appears by no means extravagant. It is amusing to note that the *Mail* heads his article "A Mammoth Planting Concern." That is commercial India all over and men here cannot apparently understand dealing in other than petty investments with capital ranging about a couple of lakhs of rupees. We are at issue with the *Mail* on the matter of large *versus* small companies, for it is now beyond question that all the vexation and obstruction thrown in the way of developing our resources emanates from Westminster; hence, big companies could exercise Parliamentary pressure on the India Office, while the Mannikins would be snubbed.—*Indian Planters' Gazette*, Sept. 5.

PLANTING NOTES FROM EAST HAPUTALE.

Sept, 16.

In this district of late we have experienced rough stormy weather, the wind veering all round the compass. And we have had only two or three fugitive showers since I last wrote you, one giving us a little over one inch of rain. We have still hot dry weather here and there is not much tea making going on, on this side of Haputale just now. I have never seen the brooks lower than they now are, and the patanas are again becoming brown and burnt up with

fierce suns, the skies day by day being without a cloud. We are anxiously awaiting the advent of the North-East monsoon. When the steady rains of the North East monsoon are with us, there will be, I am informed, a good deal of land planted with tea. Some of these clearings are from patanas—poor scrub lands and light chenas. Planters should be very cautious how they select lands for tea plantations. I am quite aware some kinds of patana soil will grow good tea. For the last quarter of a century I have seen both very fine coffee trees and of late years tea trees growing on Nayabedde estate near the road, the soil there being of a kind of peat, deep-lying and well-drained. This kind of bog soil is formed by the slow decay of some kind of vegetable matter which takes place during many years, I might say centuries. Where I now reside, we have five or six acres of rich dark soil patana land, which, if well drained, would grow tea well and profitably for years. There are other kinds of patana lands suitable for tea plantation, but great care should be taken in these days to select only proper and suitable lands, and as a rule to eschew lands growing light scrub and with a scanty growth of jungle trees on it.

Let it be remembered that poor lands that would pay a Tamby or Sinhalese to cultivate with tea or coffee, would bring loss and failure to a European. I am not one of those "tropicals" that believe in the restoration of coffee cultivation, while the red fungus can be seen on most old coffee trees, still swarming on some estates in East Haputale. Before this fungus reached coffee estates attacks of white and black bug were experienced at long intervals; but after a time or season they left the coffee trees. But with the fatal fungus came the green bug to complete the destruction caused by the fungus.

Nevertheless on suitable lands, coffee might be planted now, with the sober expectation of getting crops—half a dozen or so—before the trees are prevented from bearing well by various enemies of one kind or other; and the present price of coffee, and the local consumption of the fragrant berry seems to favour the idea of coffee planting on the hillsides of Ceylon, providing such lands are good chenas or forest lands, if the *vastatrix* fungus ever leaves Ceylon. Then there is no reason why coffee should not be successfully grown again, but I have felt the sad effects of the dire fungus, and would not depend on coffee cultivation while it exists as at present.

THE CHICAGO EXPOSITION.

ARRIVAL OF MEDALS AND CERTIFICATES.

The Hon. W. W. Mitchell in his capacity of Agent to the Hon. Sir J. J. Grinlinton, Special Commissioner of the Ceylon Government at the Great Chicago Exhibition, has received the medals and certificates awarded to Ceylon Exhibitors. In all 106 medals and certificates have come to hand. It is a little late in the day, but the medal and certificates are handsome works of art and well worth waiting for. Each medal is contained in an aluminium case, rather broader than a cigarette case, the medal itself being fixed in a frame of black velvet which moves inside the case like the page of a book and which enables each side of the medal to be easily inspected. On one face the medal, which is of bronze, bears in relief a representation of the landing of Christopher Colombus on the shores of the New World, and on the other, of which the design is in harmony, the inscription—"World's Columbian Exposition in commemoration of the four hundredth anniversary of the landing of Colombus," and then the dates "MDCCCXCII—MDCCCIII C. E. Barber *fecit.*" The name of the recipient is stamped in relief on each medal. The diploma is a beautiful work of art and well-worthy of "the greatest show on earth." It measures 36×25 inches. The design is a very elaborate one. At the top is a proscenium through which in the background is seen a view of the Exposition building. On one side Columbia and the bison are depicted and on the other representatives of the youth of the Anglo Saxon, the American, Indian and the negro races. Allegorical figures beautifully draped surround the centrepiece, while at the foot is a representation of a galley carrying as shields the arms of the different nations and in which allegorical figures are depicted. In the centre, the nature of the exhibit, the exhibitor's name and the award are given—they are engraved in every case and not written. The diploma which is a triumph of the engraver's art was executed at the engraving bureau of the U. S. A. Treasury. The Hon. W. W. Mitchell, forwarded the medals and certificates today to the recipients of these honours, the list of which is as follows:—

AGRICULTURE.

GROUP 6.

Charles De Soysa, Colombo; D. P. Dias, Kandy; J. Gauder, Colombo; Julian Heyzer, Colombo; The Orient Co., Ld.; Vavasseur & Co.

GROUP 8.

Aberdeen, Aneoombra, Ardlaw and Wishford, Blair Athol, Broadoak, and Brunswick estates; Buchanan, Frazer & Co., Bunyan, Charley Valley, Claremont, Columbia, Court Lodge, Dambatenne, Damblagolla, Dunkeld, Dunnotter, Gartmore, Gigranella, Glendevon, and Glentarf estates, Hon. Sir J. J. Grinlinton (for the Ceylon Government), Henfold, Hethersett, Holmwood, Invery, Kintyre, and Kurunduoya estates, F. G. A. Lane (for Blair Athol estate), Laymastotte, and Lynsted estates, Mackwood & Co. W Waddon Martyn, Mincing Lane and Mousakanda estates, North Matale estate (Land and Produce Company), Oononagala estate, Oriental Bank Estates Company, Ovoca, Pedro, Pooprassie, Portswood, Rahatungoda, Rookwood, St. Clair, Tillyrie, Udaradella, Vellaioya (no diploma received), Westhall and Yapame estates.

GROUP 9.

Ceylon Government (Hon. Sir J. J. Grinlinton) and the Orient Company, Ltd.

GROUP 14.

Hon. Sir J. J. Grinlinton (for the Ceylon Government.)

GROUP 16.

Government of Ceylon.

GROUP 18.

Colombo Oil Mills (G. and W. Leechman & Co.) Charles De Soysa, Clark Spence & Co. Hon. Sir J. J. Grinlinton (for the Ceylon Government) and Mackwood & Co.

FORESTRY.

GROUP 19.

Leechman & Co., The Government of Ceylon (the Hon. Sir J. J. Grinlinton.)

MINES AND MINING.

GROUP 46.

Darley, Butler & Co., Jacob de Mel, M. A. Fernando, and the Ceylon Government.

MANUFACTURES.

GROUP 87.

C. P. Hayley & Co., and the Oriental Estates Co.

GROUP 88.

Crystal Hill Estate and Julian Heyzer.

GROUP 91.

The Hon. Sir J. J. Grinlinton.

GROUP 96.

Ceylon Government (Hon. Sir J. J. Grinlinton) the Hon. Sir J. J. Grinlinton.

GROUP 97.

S. L. O. Lebbe Marikar.

GROUP 98.

D. D. de Silva & Co., A. H. Ismail, P. T. Meera Lebbe Marikar, O. L. Mohamad Macan Marikar, A. L. M. Mohama Mahamed, A. T. Mahamed Baay, M. A. Perera, and the Ceylon Government per the Hon. Sir J. J. Grinlinton.

GROUP 101.

Colombo Oil Mills Company.

GROUP 102.

Ceylon Spinning and Weaving Company, and the Ceylon Government (per the Hon. Sir J. J. Grinlinton.)

GROUP 104.

Government of Ceylon (Hon. Sir J. J. Grinlinton.)

GROUP 110.

Hon. Sir J. J. Grinlinton (for the Ceylon Government.)

GROUP 115.

Colombo Oil Mills Company.

GROUP 118.

Ceylon Government.

LIBERAL ARTS.

GROUP 149.

Lady De Soysa, Hon. Sir J. J. Grinlinton (for the Ceylon Government), Kumarihami, Lady Havelock, Wennapua Boarding School, and Convent of the Holy Family.

GROUP 150.

Charles de Silva, C. Don Bastian, and G. H. Perera.

GROUP 151.

W. L. H. Skeen.

GROUP 152.

H. F. Tomalin.

GROUP 155.

Government of Ceylon.

GROUP 157.

Hon. Sir J. J. Grinlinton.

THE PINEHILL ESTATES CO., LD.

GENERAL MEETING.

PRESENT:—Messrs F. M. Mackwood in the chair, H. St. C. Bowle Evans, R. E. Prance, C. G. Ryan and J. A. MacGillvray.

Represented by Proxy were:—Messrs. J. Masterman, J. N. Layton, J. D. Dryer, R. Trimen, T. B. Hughes, G. T. Worsley, Mrs. J. F. Kennedy, Mrs. M. C. Layton, Miss Jane Nicol, C. J. S. Nicol, Mrs. E. L. Owen, Mrs. G. Prance, Mrs. M. F. Thorne, Mrs. A. J. S. Hughes.

Proposed by the CHAIRMAN and seconded by Mr. C. G. RYAN:—That the directors be authorised out of the purchase money arising out of the sale of the Nahaketiya Estate, amounting to R190,000, to refund to each shareholder of the Company a sum of forty rupees per share in reduction of the capital amount subscribed in respect of such share.—Carried unanimously.

Proposed by the CHAIRMAN and seconded by Mr. R. E. PRANCE:—That the capital of the Company be reduced from R355,000 in 3,550 shares of R100 each (being the amount to which the capital of the Company was increased by special resolution passed on the 19th May 1894, and confirmed on the 16th June, 1894,) to R213,000 in 3,550 shares of R60 each.—Carried unanimously.

The CHAIRMAN explained the proposals of the directors for the disposal of the balance of R50,840, re-purchase money, viz.: 1st, to pay R14,300 to the reserve fund, bringing it up R21,300 = 10 per cent of the reduced capital; 2nd, to lay aside R17,000, provision for purchase of new land and bringing into cultivation, the amount to be placed to a special reserve fund; 3rd, that a sum of R10,540 be provided for extension of factory and for new machinery on Wavahoena and for an assistant's bungalow on Pine Hill; 4th, that at the next declaration of interim dividends probable in January next, the residue equal to R9,000, be divided as a bonus amongst the shareholders, subject to the advice of the solicitors of the Company.

Proposed by Mr. C. G. RYAN and seconded by Mr. BOWLE-EVANS:—That the proposal of the directors be adopted.—Carried unanimously.

This having closed the formal business, Mr. RYAN drew attention to the prices the Pine Hill teas were fetching, which he considered much lower than they ought to be.

The CHAIRMAN replied that the directors had already insisted upon better prices being obtained; otherwise there was no alternative, but to have a change.

THE FINANCIAL POSITION OF THE INDIAN TEA INDUSTRY.

Referring to Mr. Seton's table of results of working of Indian tea companies, the *Produce Markets Review* says: "An interesting table has been published by Mr. George Seton, 120, Bishopsgate Street Within, showing in detail the working of forty Indian tea-growing companies registered in London in the season 1895. The total paid-up capital of these taken together is £4,076,488, and the acreage under tea 107,013 acres; of which 90,759 are mature and 14,254 bear young plants. The cost per acre s £38, and the crop 463 lb. per acre, or 42,928,295 lb. in all. The expenses are £1,265,469, or 7·07d per lb. and the total receipts £1,660529, or 9·27d per lb. leaving a profit of £395,090, or 2·20d, the ratio of expenses to receipts averaging 76 per cent. The profit per mature acre is £4 5s 2d, or 9·69 per cent on the capital. The dividends paid were £323,074, or 8 per cent., and the amount carried forward and standing to the credit of reserve is £369,441, or 9 06 per cent on the capital. In taking the average profit some very remarkable results are lost sight of. One company makes 5·21d per pound and six make over 3d per pound. Taken as a whole the London Indian tea planting companies are thus very prosperous, which is more than can be said for the various branches of the distributive trade. It is a significant fact also that these established companies have comparatively little maturing in young plants, as they see that the danger confronting the industry in India and Ceylon is over-production. The smaller companies, not having London registered offices, no doubt are hard at work extending, and with this in view the established companies would do well to add handsomely to reserves while times remain good, and to curtail expenses as far as practicable."

The *Grocer* says: "The annual statement prepared by Mr. Seton of the working of forty Indian tea companies during the season 1895 has just been published, and gives some very interesting results. The actual sale-weight of the crop as raised by these companies amounted to 42,928.295 lb, which was an increase of 3,315,450 lb. in comparison with the aggregate of 39,612,645 lb. for the season

1894, as printed in the *Grocer* of October last. The companies and their planters contributing most largely to the production of tea in the past season were as follows: Assam, with 3,225,189lb; Jokai (Assam), with 3,063,651lb; Dooars, with 2,987,136lb; Assam Frontier, with 2,396,053lb; Land Mortgage Bank, with 2,179,187lb; and the Brahmapootra Company, with 2,175,178lb. The gardens producing the next largest quantities of tea, say between 1,304,924lb and 1,714,689lb, were those belonging to the Singlo, Upper Assam, Cachar and Dooars, Chargola, Lungla (Sylhet), Dooma, and Jorehaut companies. The plantations which turned out crops varying from about 410,000lb to a little over 930,000lb each were those known as the Chubwa, Sephinjuri Bheel, Jhanzie, Moabund, Majuli, Allynugger, Attaree Khat, British Indian, Noakacharee, Doloo, Borelli, Derby, Darjeeling, Longai Valley Eastern Assam, Lebong, Indian of Cachar, Scottish, Assam, Moran, Tingri, Chandpore, and Dejoo tea estates. The minor growths gathered were by the Endogram, Boroka, Hunwal, and Balijan planter, who had not in all cases the unenviable reputation of paying the smallest dividends. The best of these were indeed paid by Assam, Jorehaut, Brahmapootra, Chandpore, Lebong, Moabund, Rajmai, and Sephinjuri Bheel companies, whose distributions of profits on their ordinary shares were at the rate of from 15 per cent. to 20 per cent. Others, such as the Dooars, Derby, Attaree Khat, Balijan, Doom Dooma, Jhanzie, Jokai (Assam), Moran, and Tingri proprietors, returned dividends of 10 per cent. to 12½ per cent. Less successful owners and growers of Indian tea did not pay more than 5 per cent. to 8 per cent. out of their year's net earnings; and there were some whose payments were at the poorer rate of 2½ per cent to 4 per cent on their paid-up capital. This, for the whole of the forty companies, reached the sum of £4,076,488, and the total area under cultivation (including young and matured plants) covered fully 107,000 acres. The cost per acre varied greatly, ranging from £19 to £79. The expenses of cultivating and managing the different estates swallowed up from 4·34 pence to 10·33 pence for every pound (avoirdupois) of tea produced; and whilst the prices realised were from 6·7 pence to 13·62 pence per lb., the actual profit fluctuated from 0·31 to 5·21 pence for the same quantity of drinkable tea. The yields per acre, of course, differed widely, according to circumstances of locality, management, weather, time of gathering, &c., and were calculated at from 282lb to as much as 685lb per mature acre, running up in two instances to 936lb and 1,045lb for a similar breadth of plants. All this indicates a high state of prosperity for the British Indian tea companies, and they may look forward to achieving still greater success in their industrial enterprise, as there is a constantly increasing demand for their produce in the home country as well as in the colonics."—*H. and C. Mail*, Sept. 4.

TEA AND COFFEE COMPANIES REGISTERED.

DIGALLA CEYLON TEA ESTATE COMPANY, LIMITED.

Registered August 5th by Murray & Co., 11, Birchin-lane, E.C., with a capital of £25,000 in £10 shares. Object, to adopt an agreement with R. B. Reid for the purchase of the Digalla Tea Estate, Kelany Valley, District, Ceylon, and to plant, grow, and produce tea, coffee, cinchona, cocoa, &c. The directors are H. K. Rutherford, G. A. Talbot, and R. B. Reid. Qualification, £250. Registered office: 21, Mincing-lane, E.C.

BRITISH CEYLON TEA ESTATES COMPANY, LIMITED.

Registered July 31, by Warner and Seligman, 21, Great Winchester-street, E.C., with a capital of £160,000 in £5 shares. Object, to adopt and carry into effect an agreement expressed to be made between George L. Davies of the one part and this company of the other part; to acquire by purchase or otherwise any grants or leases from Government, and to purchase, take on lease or in exchange, hire, or otherwise acquire from any other company or companies, person or persons, any tea or other estates or lands or property of any description situate in Ceylon, British India, or elsewhere, or any right or interest therein, or any rights or privileges (including any copyrights or trade marks) which may be deemed necessary or convenient for the purposes of the company; to cultivate tea, coffee, cinchona, rice, coca, cocoa, coconuts, and other produce, and to carry on the business of tea and coffee planter in all its branches; to carry on and work the business of cultivators of and dealers in every kind of vegetable, mineral, and other produce of the soil; to prepare, manufacture, and render marketable any such produce, either in its prepared, manufactured, or raw state, and either by wholesale or retail; to construct and maintain buildings, sawmills, roads, rail, and tramways, &c. The signatories are:—

	Shares.
G. L. Davies, 32, Stanley-gardens, N.W. ..	1
E. E. Abrahamson, 18, Rockley-road, West-Kensington	1
T. W. Watson, Pailton, near Rugby ..	1
D. H. Gibson, 40, Broad-street House, E.C. ..	1
E. H. King, 6, Belsize-park-gardens, N.W. ..	1
H. E. Warner, 21, Great Winchester-street, E.C.	1
J. D. Campbell, 65, Bramah-road, S.W. ..	1

DUNSINANE TEA COMPANY, LIMITED.

Registered August 28, by Murray, Hutchins, Sterling and Murray, 11 Birchin-lane, E. C., with a capital of £100,000 in £10 shares. Object, to adopt and carry into effect an agreement expressed to be made between W. R. Arbuthnot and P. M. Anstruther of the one part and this company of the other part for the acquisition by purchase or otherwise, as a going concern, of the tea estate known as Dunsinane, Kotmalie Korale, in the Nuwara Eliya district, Central Province, Ceylon, to develop and turn to account the said property in such manner as the company shall see fit, and to carry on business as planters and growers of and dealers in tea, coffee, cinchona, cocoa, cardamoms, rice, &c.; to work mines or quarries, and to find, wind, get, work, crush, smelt, manufacture, or otherwise deal with ores, metals, minerals, oils, precious and other stones or deposits or products, and, generally, to carry on the business of mining in all its branches; to build, maintain, and work tea factories, coffee-curing mills, roads, tramways, and other works, matters, and things of any kind; to acquire and turn to account patents, &c.; to undertake the office of trustee, executor, &c.; as merchants, exporters, importers, traders, engineers, and any other trades, businesses, or undertakings whatsoever; and to transact all kinds of financial business. The signatories are:—

	Shares.
W. R. Arbuthnot, Plawhatch, East Grinstead ..	1
P. S. M. Arbuthnot, Plawhatch, East Grinstead	1
H. D. Arbuthnot, 2, Royal Exchange-buildings, E.C.	1
A. N. Frewer, 34, Nicholas-lane, E.C.	1
J. C. Sanderson, 37, Mincing-lane, E.C. ..	1
J. F. Shelly, 37. Mincing-lane, E.C.	1
W. C. Somerville, 62, Handen-road, Lee, S.E. ..	1

SARAPIQUI ESTATES COMPANY, LIMITED.

Registered August 28th, by J. Ballantine, 21, Cornhill, E.C., with a capital of £120,000 in £1 shares. Object, to adopt and carry into effect an agreement expressed to be made between G. Rothe of the first part, the Sarapique Syndicate, Limited, of the 2nd part, and this company of the third part, for the acquisition by purchase or otherwise, as agoing concern, of certain estates situate in the Republic of Costa Rica, belonging to G. Rothe, to develop, cultivate, and deal with the said properties in sush manner as company shall see, fit, and to carry on business as coffee planters, growers, exportors, and merchants, as also of such other trees, planes, crops, and produce as can or may by grown or produced on the property of tho company and to prepare, treat, and fit the same for market and to sell, ship, and dispose of the same; to construc and maintain any roads, buildings, works, ways, rail and tram roads, wharves, piers, docks,

factories, ware houses, electric works, &c.; to turn to account the lands, estates, properties, &c., of the company by clearing, draining, irrigating, fencing, planting, and building thereon; as farmers and graziers, stock-raisers, &c. to lay out towns and villages, and to promote mmigration thereto; to acquire and turn to cconnt any patents, &c. The signatories are:—

	Shares.
W. Austin, Sunnyside, South Norwood-part S.E.	1
G. D. Jennings, 28, Gracechurch-street, E.C. ..	1
O. Magniac, Hays Wharf, Southwark ..	1
J. H. Thring, J.P., Alford, Castle Carey ..	1
J. L. Shand, 24, Rood-lane, E.C. ..	1
T. Horne, 141, Endlesham-road, Balham ..	1
W. Baker, 33, Billington-road, New-cross ..	1

OUVAH COFFEE COMPANY, LIMITED

Registered August 7, by Hollams, Sons, Coward and Hawkesley, Mincing-lane, E.C., with a capital of £100,000 in £10 shares. Object, to adopt and carry into effect an agreement expressed to be made between the Ouvah Coffee Company, Limited, to the one part and this company of the other part, for the acquisition by purchase or otherwise, as a going concern, of the business and undertaking of the said company (henceforth to be known as the old company, incorporated 1864), and, generally, to lend money to such persons or companies, and on such terms as may be deemed expedient, and in particular to planters, merchants, manufacturers, and landowners; to develop the resources of such lands estates, &c., as may from time to time be acquired by the company by clearing, draining, planting, and irrigating the same, and by building thereon; to lay our towns and villages; as farmers, graziers, and stock-raisers, shipowners, timber merchants; to construct and maintain rail and tram roads, docks, piers wharves, warehouses, &c.; and the general business of a mining, milling, smelting, and metallurgical company. The signatories are:—

	Shares.
A. R. Brown, 5, Dowgate-hill, E. C. ..	1
N. Stewart, Burgess-hill, Sussex ..	1
L. Famin, 57, Eastcheap, E.C. ..	1
J. G. Wardropp, 2, Challoner-street, West Kensington ..	1
P. Oswald, 130, Fenchurch-street, E.C. ..	1
J. Roberts, 5, Dowgate-hill, E.C. ..	1
H. J. King, 5, Dowgate-hill, E.C. ..	1

—*H. and C. Mail*, Sept. 4.

PLANTING AND PRODUCE.

Tea in Norway.—If we may judge by the complaints made by British tourists in Norway and Sweden, there is room for the development of the tea trade in those countries. Indian and Ceylon tea are not to be met with in the ordinary way, and the art of brewing tea is sadly neglected. Coffee is in favour much more than tea.

Brazil as a Tea Growing Country.—Some Brazilian planters, we learn, are very much impressed with the idea that tea could be successfully and profitably grown in Brazil, and experiments on a somewhat extended scale have been talked of. The idea is not a new one. Some British capitalists had the suggestion under consideration not very long ago, and one well known firm of enterprising tea agents visited the country to see how far the prospect was hopeful. We do not know the conclusion arrived at, but we should imagine that there were difficulties in the way. Allowing that the conditions of soil and labour were favourable there would be the question of security and title, matters of considerable importance where British capitalists are concerned. The three principal coffee producing provinces of Brazil, viz., Rio de Janeiro, Minas Geraes, and Sao Paula are in about the same latitude as Central Australia, and therefore much further south than Java.

Planting in British Central Africa.—The report of Sir Harry Johnson on the British Central African Protectorate for the year 1895 is very satisfactory. One of the most interesting parts of the report describes the development of the coffee planting industry, which is carried on in the Shire Province, in Angoniland, and in the Marimbo district. It is to the coffee planting that the Commissioner of Nyassaland ascribes the prosperous change that has recently been experienced in that part of Africa. Tea has been introduced, while tobacco is a great success. As regards the labour question, the population statistics, which Sir Harry Johnston has been at some pains to compile are of great interest and value. The total of European population is 289, of which nearly half is in Blentyre. The native population is estimated at about 850,000. These figures, taken with the the not very encouraging statistics as to the health of the territory, make it clear that the European hill settlements must always remain islands in the ocean of an enormous native population in the plains. "We must encourage," says the report, "the unchecked increase of the negro population," for ultimately the whole future of Central Africa depends on the natives themselves. "Given abundance of native labour, and the financial security of the Protectorate is established." And again, "It only needs a sufficiency of native labour to make this country relatively healthy" (that is, by the clearance of jungle and the drainage of marshes) "and amazingly rich." Sir Harry Johnston sees that this can only be done by just and liberal treatment of the natives. Unskilled native labour at present only receives some 3s a month, and skilled labour only very ocasionally reaches as much as £40 a yar.

Cooly Labour in British Colonies.—Mr. Chamberlain has been interesting himself about coolie labour on the sugar estates not only of Natal but in the West Indies, and a despatch has been sent to the various governors of the colonies concerned. In the West Indies very stringent laws protect the coolie labourers, but he suffers considerably from the tyranny of the "babajees," who treat low caste men with a very high hand, and fleese them freely. Coolies frequently contrive to save money, and are to be met with amongst the shopkeeper class. In British Guiana there have been instances of coolies amassing wealth and owning racehorses, but while labour as in demand in India it seems strange that so many coolies are found willing to go to colonies, where they are treated as inferiors by negroes, and have at any rate until they are used to the country, to put up with very much that is repugnant to their feelings. In the early sixties a large proportion of the coolie labourers on the sugar plantations in British Guiana were mutineers from India, who had left their country for their country's good as well as their own. They were a rough lot, and occasionally made things lively for the planters. Owing, however, to the large proportion of negroes in the colony no very serious mischief occurred.—*H & C Mail* Sept. 4th.

INDIA AND CEYLON TEAS IN AMERICA.

New York, Aug. 19.

The market for the past week has shown a better feeling than for some time and more sales are reported; some arrivals of new season Indias show good liquor with fine appearance of leaf and have met with ready sale at full rates. Ceylons, medium and lower grades, are plentiful and sell at easier prices, while good liquoring, well made, tippy teas are somewhat scarce and wanted. Cable advices from abroad report that the stock of India teas is lower in London by 2.000,000 lb. than at the same date last year, while shipments from Calcutta last month were 3,000,000 lb. behind that of 1895, which in itself is sufficient to boom prices of India teas, were it not that the spot stock of Ceylons in London is several millions in excess of that of a year ago; but, judging from all information obtainable, the buyer who carefully looks at his stock and replenishes before a very long time, will probably find that he has not lost anything.

A dispatch from Victoria, B. C., says: Despite the arrival in the field of Nippon Yusen Kaisha as the fourth competitor for Oriental trade to British Columbia and Puget Sound ports, there will be no cutting of tea cargo rates this year, and no sailing ships will be chartered. A combination is announced between Central Pacific, Northern Pacific, Oregon Railway and Navigation companies and the Japanese line of steamers, and a uniform rate of 1½ ₱ lb. has been agreed upon.—*American Grocer*, Aug. 19.

MADAGASCAR.

London, Sept. 10.—Twenty thousand natives are ravaging the northern district of Madagascar.—*Australian Paper*.

British Guiana and its Resources.—By the Author of "Sardinia and its Resources." (G Philip and Son.)—This is a seasonable book, for it tells us something of the value of a country about which there is not a little trouble just now. It produces sugar, but not to much profit, though the writer discerns signs of improvement. It furnishes gold, and that in no small quantities. The yield has grown from 250 oz. in 1884 to 110,432 oz. in 1894. Of course it is the opportunity of digging for gold, not of growing sugar, that our Venezuelan friends are anxious to grab. There is a timber trade, but it is not flourishing. As to the natural attractions of the place, the vegetation is magnificent, especially in orchids and palms. The climate is indifferent, but in worse repute than it deserves. The annual rain-fall is 80 inches; the thermometer never falls below 70 degrees; the death-rate is 38 per 1,000.—*Spectator*.

FOREST AND SOILS.

The value of underbrush must not be underrated. Although its mothers young trees, it is useful to forests of larger growth. The amount of mineral matter which a tree absorbs is insignificant. Water is the essential element. In checking evaporation and retarding the flow, undergrowth is often necessary. But the smaller amount of dead wood in a forest the better, since it breeds many kinds of insects, some of which may invade the living trees. The material resulting from decay, however, enriches the soil, so that it is better to burn the dead wood which cannot be utilised. In that way the soil is enriched just the same, the insects are disposed of and the underbrush is not seriously disturbed.

Prof. F. H. Storer, in *Agriculture*, says: "Within porous soils nitrate are doubtless formed rather freely, and, as is well-known, the nitrates are easily washed out from soils, and are liable to go to waste after every rain that is long continued. They are, in fact, leached out of the soil, and the manure from which they come rapidly wastes away. It is said to be a matter of old and familiar observation in Germany, that in sandy regions, in seasons that are particularly wet, the soil may finally be so thoroughly leached that it becomes unfruitful. When we consider the facts that nitrates are easily washed out of the soil, that they are absolutely essential to plant growth, and that they are continually produced, during the period of growth, from humus, by the action of nitrifying bacteria, we can appreciate the damage to light soils by fire. Land thus damaged needs very careful tillage and green manuring before it can produce a crop of consequence."—*Journal of the Society of Arts*, Aug. 28.

THE DUMONT COFFEE COMPANY, LTD.

(*Under Acts 1862 to 1890.*)

This Company is formed for the purpose of acquiring, carrying on, and developing the celebrated Coffee Estates of the Companhia Agricola Fazanda Dumont, situate in the district of Ribeirae Preto, in the State of Sao Paolo, United States of Brazil.

5½ % Mortgage Debentures £100	..	£400,000
7½ „ Cumulative Preference (as to Capital and Interest) of £10 each	..	400,000
Ordinary of £10 each	.. ..	400,000
		£1,200,000

Directors and Friends take £50,000 of each—£150,000

Present Subscription, 26,665 Preference	at £10	266,650
26,665 Ordinary	at £10	266,650
26,667 Debentures	at £100	266.700
		£950,000

Debentures redeemable 1920 at par or by six months' notice, with £15 per cent bonus:—

Calls, &c.		Pref.	Ord.	Debs.
On application	..	£1	£1	£10
On allotment	..	£2	£2	£40
On 20th October	..	£3	£3	£25
On 15th December	..	£4	£4	£25

Directors:—P. R. Buchanan, Esq., Chairman (Chairman of the East India and Ceylon Tea Company and Director Consolidated Tea and Lands Co.) H. K. Rutherford, Esq., (Chairman of the Ceylon Tea Plantation Co., Ld.) Major F. B. McCrea (Managing Director Army and Navy Co-operative). Hon. H. A. Lawrence (Director Imperial Ottoman Bank). G. A. Talbot, Esq. (Director of Selangor Coffee Co.) Robert Hart, Esq. (Chairman of the Baraoora Tea Company.)

Bankers:—Messrs. Glynn, Mills, Currie & Co., 30, Lombard Street, E.C.

Brokers:—Messrs. Coates, Sons & Co., 99, Gresham Street, E.C.

Freehold Estate 110,000 acres; 13,000 acres planted with coffee. Statement of coffee trees in bearing—yield and profit:—

	In bearing.	Yielding lb.	Profits.
'92	1,300,000	3,897,000	£53,978 19 0
'93	1,400,000	4,200,000	£68,128 19 0
'94	1,500,000	5,107,000	£86,589 4 3
'95	2,069,700	8,400,000	£127,453 3 6
'96	2.476,500	9,000,000 (Est.)	£142,226 12 6

Taking the profits of 1895 as a basis, although not half the planted area was yieding crops ..		..£127,453 3 6
Less Debenture, Int. ..	£22,000 0 0	
„ Preference, Int. ..	£30,000 0 0	
		£52,000 0 0
Balance .. for Dividend and Reserve.		.. £75,453 3 6

The purchase price has been fixed at £1,200,000, payable two-thirds in cash; balance and debentures; preference and ordinary in equal proportion.

The Company take over the estates as from 1st January, 1896, and are entitled to the profits earned during the current year. These are estimated at about £142,000, and will be used for providing working Capital, for forming a Reserving account, and for the payment of interest on the debentures, and a dividend to the preference and ordinary shareholders from the dates of payment of the instalments up to 31st December, 1896. It will be noted that the average profit of 1894 and 1895 is sufficient to pay the debenture interest and preference dividends more than twice over.

The Bandarapola Ceylon Company.—The first we believe among the Ceylon Tea Companies in London to declare an interim dividend has been the Bandarapola Ceylon Company. The directors of the Company, as will be seen from the letter which we publish elsewhere, have declared an interim dividend at the rate of 10 per cent per annum (free of income tax) for the half-year ending June 30th last. We heartily congratulate the shareholders.

SCIENTIFIC EXPERT FOR THE TEA INDUSTRY.

(From an Occasional Correspondent.)

Some time ago you published a discussion that took place at a meeting of the Indian Tea Association regarding the appointment of a scientific expert. One speaker animadverted rather severely on the niggardly manner in which the Government of India had always dealt with this question, and not without just reason. Though the United States and France contribute largely, Denmark spends annually £11,000, and all our colonies give liberally towards agricultural colleges and scientific research, it must be borne in mind that the British Board of Agriculture, even in the face of severe and long-continued depression, has never supported agricultural education and investigation to anything approaching the extent its importance demands, or as the countries named and others have. May our Indian Government be induced to follow the better example and not that of the mother country hereafter. The tea industry is a great industry and if its members act with unanimity, and sustained energy it ought in these times to be all-powerful in such matters. No doubt with the cost of pushing new markets, a still more urgent matter for the present, there may be difficulty in paying a competent expert adequately, and retaining his services long enough, unaided. I am not, however, so sanguine of very much being soon accomplished, beyond what has already been and may yet be done by the so-called "rule of thumb" of practical observation and experiments in manufacture, because I do not believe that chemistry is calculated to do so much for tea as in some other processes of manufacture. Tea-making does not, I consider, come within the realm of science so fully as is generally supposed, one reason being it is very seriously affected by the uncontrollable influences of atmosphere and weather in the open field. Still, it is but right that practical men should have the aid of the more skilled scientists, and in the course of years—possibly very soon —this might be productive of great results even in manufacture. Neither may science be enabled readily to do much in the way of cure and eradication of blights, but it could not fail to add to our knowledge and do something. Scientific and minute and careful observation of the life, history, and habits of most of the parasites that affect tea have been made and recorded by Wood-Mason, Cotes, Dudgeon, and others, most interesting, doubtless, but I have not heard of any practical benefit derived. The effective practical remedy is to increase the constitutional vigour of the bushes and thus give them power to resist and grow out of pests, or perhaps develop new varieties of disease-resisting plants. But I believe it is in the direction of analysis of soils to ascertain what elements are wanting and what manure or application is necessary to yield or improve the quality of the tea that most is to be expected. In regard to this it is to be feared practical planters are entirely in the dark, and experimenting, while difficult and costly, is likely to be of little avail. Of course in regard to manuring according to soil for vigorous, healthy plant growth generally, a competent analytical agricultural chemist could not fail also to be of the greatest service. This latter branch of manuring does not seem so urgent for tea, which is not an exhaustive crop as far as rude growth of the plant and leaves, irrespective of *quality*, is concerned, certainly not so much so as the extension of new markets meanwhile. Even should there be no excess of nitrogen in the rainfall in tea countries (and upon this doubt would seem to be thrown by more recent analysis), the cheapest form to supply it is in green-manuring, and for this the unusual abundance of leguminous herbs, plants, shrubs, and even trees (*papilionaceæ* is peculiarly favourable, they having all the capacity of fixing and utilising the free nitrogen of the air. It will be long, I feel convinced, before it can prove profitable to apply artificial manures, except those, should such be discovered, productive of quality. Unfortunately, in many parts, the supply of local manure is very limited and poor, and if it were in greater abundance the cost of transit would be prohibitive. Hence the importance of green-manuring and top dressing, little more being practicable in many cases. The indigo planters have always had the reputation of being good cultivators, but indigo being one of the family of *Leguminosæ* is in their favour.

One speaker who took part in the discussion referred to is reported to have said that the subject of a scientific expert for tea had been discussed at a meeting of the Royal Society, and that Dr. Voelcker had stated that scientific inquiry should extend over a period of twenty years. I doubt very much if ever this subject has been under consideration by the Royal Society, and am certain if Dr. Voelcker ever expressed an opinion of the kind he would have assigned a much longer period. The same speaker asks "how many proprietors of tea gardens could be found who were so considerate for posterity as to spend large sums of money annually from which they themselves could derive no benefit." But with a long-lifed plant like tea especially, this is just what must be done in the interests of present proprietors as much as that of posterity. There is often short-sighted procedure in regard to the management of tea property that is quite as much opposed to the interests of the present owners as of posterity if rightly viewed. This applies equally to the conquering of new markets as to the employment of scientific experts. The fruits of such efforts should all be anticipated, or the absence of them discounted, in estimating the present value of tea property. All who can in any measure realise the difficulties attending the chemical investigation of tea culture and manufacture, and the nature of scientific research in connection with agricultural chemistry in this country, so far from considering twenty years too long, must have good reason to fear that would not prove long enough to obtain really valuable results, not to speak of exhausting the subject. We have but to think of the conflicting opinions and results of agricultural chemists in different countries. Sir John Bennet Lawes has since 1843 been carefully conducting most elaborate scientific experiments in agricultural chemistry in all its departments on his ancestral property at Rothamsted, aided by that eminent chemist Dr. (now Sir Henry) Gilbert, with a thoroughly equipped laboratory and a staff of scientific and practical assistants, at a cost to himself of thousands of pounds annually. They do not consider their investigations yet exhausted. So far from it, Sir John B. Lawes in 1889 set aside £100,000 under the necessary trust deed to secure the continuance of those experiments after his death. Such is his opinion of the time required for such research and the duty to posterity in such a cause.

But we must not for all this be discouraged. The chemistry of tea may be considered practically an unexplored field. There will be all that has been accomplished in agricultural chemistry, and in connection with the arts and manufactures up-to-date to aid us at the outset. And if practical planters have all thought out, and worked up to the points at which they come to a standstill, and the scientific expert be well directed and put on the track, much may possibly be achieved in a short time.

Of course there is much in regard to such research that proves rather interesting than of practical utility. It is interesting to determine the amount of nitrogen in the rainfall, the loss of nitrogen by drainage, the life history of pests and parasites, possibly also the conditions of the atmosphere that are suffered to mysteriously affect quality but unfortunately those matters are beyond the control of science. Recently German chemists have claimed the discovery of a method of inoculating the soil, by which it is secured that the conditions under which leguminous plants can fully assimilate the nitrogen of the air shall always be fully present. To this inoculating material they have given the name "nitragin." If there prove to be

any practical benefit in this it could be applied to green manuring for tea. The same with many other discoveries.

Allusion was also made in the discussion to Mr. Bamber, the scientific expert who was appointed by the Indian Tea Association a few years ago. He doubtless made the best of his time and opportunities. His report was a valuable contribution to the literature of tea, and is now the standard work on tea generally, though he stamps with his approval at least one, in my opinion, vital fallacy in tropical cultivation. He gave all the varied opinions ever held or expressed by planters on different subjects, and he described or referred to all the blights and pests to which tea is subject, but without aiding as to their eradication or cure. Neither was much added to the knowledge of the chemistry of tea, and I fear there was little or nothing contributed towards improvement in the practice of manufacture. He gave the undigested results of some manuring experiments—some of them of old date—by planters as furnished to him. His attention never seems to have been directed by the Association to ascertaining the mineral elements required to produce quality, or to even visit the district conspicuous above others for quality. But I repeat that Mr. Bambor acting under the orders of the Tea Association, did all what was possible in the time, and for this he should have full credit. Allusion was also made to Dr. Watt and his having done "much good work in a short time." Dr. Watt I know as a botanist and an able writer. He may have some knowledge of chemistry also, but I am unaware if he be an agricultural chemist or a practical agriculturist. He has done something for tea by his investigating into the damage to the lead linings and tea from the use of unseasoned and otherwise unsuitable wood for chests.

In addition to the noble example of Sir John B. Lawes, much is being done at home, I believe, entirely by private enterprise unaided by Government. The next of importance is perhaps the experimental station of the Royal Agricultural Society of England at Woburn, aided by the Duke of Bedford, and conducted by Dr. Voelcker. Experiments are carried no a smaller scale at Newton-le-Willows, and by the more enterprising farmers' associations as in Eastern Ross. Most laudable and beneficial have been the unaided efforts of Mr. Findlay, of Fifeshire, in the rearing of new varieties of disease-resisting potatoes. All this should prove an incentive to the great tea industry.

Ceylon also as usual bids fair to set India another example. Not only a scientific expert, but technical schools for instruction in tea manufacture are being advocated for the island.

The Indian tea industry ought to have a competent agricultural chemist who is an enthusiast in his profession with a well-equipped laboratory and an efficient staff of assistants. These should be liberally supported as a permanent institution. In regard to such an investigation no half measures can suffice. They can only prove a delusion and a snare.

It is to be hoped, therefore, that the Indian Tea Association and tea industry may make an unanimous and lasting effort worthy of so great a cause, and that, as recommended, the Government may be induced to provide half tho funds thus required in the interests of an industry that contributes so much towards the prosperity of India and the empire generally.—*H. & C. Mail*, Sept. 4.

PLANTING AND PRODUCE.

The Glory has Departed.—The excitement that used to attend the race of the China tea clipper has gone, so far as this country is concerned, and if a cable from New York contains reliable information it is much tho same in regard to America. From New York we learn that the British steamer "Hankow" arrived from China on Sunday. She and the steamer "Glenogle" left China at the same time in June loaded with tea, and the "Glenogle" arrived on Wednesday. Captain Orr, of the "Hankow," when told of the arrival of the "Glenogle," said: "I received instructions from the company's office in London to keep up a speed of only 10½ knots an hour. I could have done 14 knots, and might then have beaten the "Glenogle." The "Hankow" is owned by Messrs. W. Milburn and Company, of London.

Popularising Indian Tea.—The connection between a church organ and Indian tea does not seem very near at a first glance, but in Dover they contrive to bring it about. At St. James's Church there a new organ is wanted, and a somewhat novel way of providing the necessary funds has been taken. According to the rector, in this month's parish magazine, a number of the parishioners, rich and poor, have taken up the sale of tea, which is sent home by a well-wisher in India, the profits going towards the fund, which has already reached a considerable sum.

Produce and the Trade Returns.—According to tho Board of Trade returns for August there is a diminution in the import of tea as compared with August, 1895, amounting to £324,908. Of this India's share in the decline is £216,500 and Ceylon's £77,000. Cocoa fell off the value of £76,886. Less sugar by £210,000 came to us this August, Peru being the only source from which we obtained more than last year. The greatest falling off was in the arrivals from Germany and the Philippine Islands. The quantity of wheat (5,153,000 cwt,) compares with 9,966,000 cwt. in 1895 and 8,717,000 cwt. in 1894. The United States sent 2,286,000 cwt. or only 353,000 cwt. less than last year, but from Russia, the Argentine Republic, the British East Indies, and Australasia there came in the aggregate only 1,652,000 cwt. compared with 6,428,000 cwt. last year. The statistical position of wheat would seem, therefore, to be favourable to a rise in price but for the recent heavy shipments from the United States. It must be borne in mind that tho figures for August, 1895, were unusually high, and that this year August had only 25 working days compared with 26 last year.

A Plea for Coffee.—Mr. David Strang, a "coffee specialist," of Southland Steam Coffee and Spice, Mills, Invercargill, New Zealand, writes with reference to the decline in the consumption of coffee: "Perhaps the reason why the consumption of coffee is on tho decline is that manufacturers have not given it any special consideration. If the trade were taken up by a few specialists, on the same lines as the cocoa trade is run, it would, in my opinion, increase the sale. I have gone to a lot of trouble and expense in machinery and other matters to get coffee up in several forms to suit the various tastes (best raw materials only being used), and the public have the following variety to choose from: Raw coffee, roasted coffee, pure ground coffee, pure coffee with pure chicory only, patent soluble coffee powder, made instantly with boiling water or milk, and patent 'Ko-Koff' coffee, being puro coffee and chicory with a small proportion of specially prepared pure cocoa.,"

A New Rubber Industry.—The new rubber industry at Lagos affords one of the most remarkable instances of the rapid development of an industry that has taken place in recent years in any British colony. It owes its existence to a wild plant which was only discovered in Lagos within the last two or three years says the *Kew Bulletin*. It was found to be new as a source of rubber, although there is now reason to believe it had yielded some of that formerly exported from the Gold Coast. At the present time Kickxia rubber from Lagos has established itself as a commercial article in great demand. The exports in January, 1895, were 21,131 lb. of the value of £1,214. This was practically the beginning of the industry. In December, 1895. the exports had increased to 948,000 lb. of the value of £51,488 9s 4d. From a recent return, communicated to Kew by the Government of Lagos, the total exports during the year 1895 amounted to 5,069,504 lb. (2,263 tons) of the value of 269,892 13s 10d. This considerable industry has therefore been called into existence within twelve months. The rubber is purely a forest produ t, a d

the collection and preparation of it have been effected by means of native labour. The success of the industry is another indication of the undeveloped resources of our West African Colonies.—*H. and C. Mail*, Sept. 11.

THE BRAZILIAN COFFEE TRADE.

AN INDUSTRY WHICH HAS NOT HAD FROM BRITISH CAPITAL ALL THE ATTENTION IT DESERVES.

A correspondent writes :—The wide disparity between their financial standing as nations and their commercial resources must often have struck all but the most superficial observers of the South American republics. The Argentine Republic, Brazil, Uruguay, and Paraguay have all passed through a more or less acute crisis in their national finances, and are now all at varying stages of convalescence. Brazil, which from the point of view of national finance, probably occupies the worst position, must be awarded, in any comparison based on commercial resources and potential national riches, only the best place of any of the republics on the South American continent. It may be some such considerations as these which have produced the recent strength in South American securities. New agricultural industries, the constant extension of existing sources of revenue, and the almost boundless territorial possessions of Argentina and Brazil are all matters which may well for a moment lead investors to disregard Government mismanagement of national finances, and look rather to the immense success which in so many South American fields has over and over again attended private enterprise.

The Brazilian coffee industry is a case in point. A fertile soil and every natural opportunity have combined to produce a trade which numbers among those engaged in it the wealthiest men in Brazil. A constant stream of immigration from Europe keeps up a supply of healthy labour. Spaniards, Scandinavians, but principally Italians and Germans, are annually landed in their thousands in Brazil, and rapidly absorbed into the multitudes engaged on the great coffee estates of San Paulo. The State of that name contains a population of more than 2,000,000, at least one-third of which is foreign by birth. Of the 160,000 souls comprising the population of the city of San Paulo, the capital of the State, probably one-half are foreigners. The State itself produces three-fourths of the entire coffee crop of Brazil, or, on the estimates of the export for 1896, receives about £15,000,000 annually from this single industry. It is obvious that an industry of this kind and magnitude cannot be considered as anything but one of the staple resources of the country where it is carried on, and this the coffee trade is, in fact, to Brazil.

The English-owned San Paulo Railway connects the great inland network of Railways in the State of San Paulo with the sea at the port of Santos. As a result of recent negotiations with the State and Federal Governments this line is about to spend from £1,500,000 to £2,000,000 in doubling its track and in building new stations and warehouses to meet the ever-increasing demands of the coffee trade upon it. Needless to say, various London banks trading in Brazil have branches in San Paulo and at Santos, its port; and it is very certain that the abandonment of the business done by them in the coffee province would have a very considerable influence for the worse upon their dividends. San Paulo's prosperity rests upon the coffee trade; but it is notorious that while German, Italian, and American capital has been freely invested in coffee estates, English capital has not, up to the present, shown any inclination to flow in the direction of that outlet. This apparent want of enterprise may arise from lack of opportunity of knowing the truth about the coffee industry. German labour may attract German capital and Italian immigration Italian capital; while the American, well aware of the enormous imports of Brazilian coffee into the United States, is not slow to invest his capital at the fountain head of the trade.

Still, with the tenure of property absolutely protected, and a public peace which is only occasionally disturbed by brawls between the various races congregated in the State, it is not to be wondered at that British capital is now moving to a much greater extent than has in the past been the case in the direction of Brazilian coffee estates. A loan of £80,000 on a portion of one of the estates is a comparatively small transaction. What may in time come to pass will probably be the placing of some of the larger estates entirely in English hands, with English capital behind them. Given a productive estate, with a good plant and railway service of its own, as well as a good connection with the State lines, well stocked with trees, with facilities for the planting of more as the business extends, and—what is most important—a good record of increasing profits in the past, and British capital would not be slow to avail itself of the opportunity of investment. A venture of this kind would offer a security almost equal to that of real property in this country, with potentialities of profit infinitely greater. A Brazilian coffee company, capitalised in a fair proportion to the extent of the property acquired, ought to be able to pay a steady dividend of 15 per cent. on its ordinary shares, and to create a strong reserve fund at the same time.—*Financial News*, Sept 9.

TEA IN AUSTRALIA.

Teas.—A little demand for Ceylons; 200 chests sold at 5½d, and 100 chests of fine sold at 1s, 250 quarter-chests of Kaisow buds also placed; 500 half-chests of Indian sold. The second sales of new season Foo Chow teas, ex Sikh, were held on 27th August, by Messrs. Geo. Crespin and Son and Messrs. Fraser and Co. The biddings were not brisk, and results were disappointing to importers, prices ruling low. At the two auction sales 3,893 chests and half-chests sold up to 9½d for S.O.P., Panyongs to 6½d. At the auction held on the 1st September, 676 packages were offered, 409 packages selling up to the following prices: For pekoe, 10d; broken pekoe, 10½d; broken orange pekoe, 10¼d; pekoe souchong, 6½d. The Acme packages sold up to 10¼d.—*Leader*, Sept. 5.

Scientific Expert for the Tea Industry.—An occasional correspondent in the *Home and Colonial Mail* has contributed an interesting article on this subject which we quote on another page. The writer does not consider that tea-making comes within the realm of science so fully as is generally supposed, but at the same time he thinks it right that practical men should have the aid of skilled scientists and that this might be productive of great results even in manufacture. Complimentary reference is made to Ceylon in the course of the article.

COFFEE AND RUBBER CULTIVATION IN CEYLON.

Coffee and rubber are, at this moment, the two tropical products, the supply of which is in no danger of exceeding the demand, and at profitable prices. Attention has been very prominently drawn by us in the columns of the London *Times* to the falling-off and scarcity in the supply of coffee—and in connection therewith to the small encouragement there is for extending the cultivation of tea beyond India, Ceylon, and perhaps Java. We do not at all want home capitalists to be led into the foolishness of embarking their money for the opening of tea gardens whether in Africa, South or Central America or elsewhere. We doubt, indeed, whether our Java neighbours would not do better in keeping to coffee and cinchona; but that is their outlook. On the other hand in respect of our old staple, coffee, there is strong encouragement to extend the culture, and one result of the attention drawn to the subject is that we find new and influential Companies brought before the British public for the promotion of coffee cultivation in Brazil as well as Costa Rica. With both of these, well-known leading Ceylon planters—Messrs. H. K. Rutherford, J. Huntley Thring, J. L. Shand and G. A. Talbot—are connected as Directors; and there can be little doubt that the result will be a considerable impetus to production. The pity is that with a product so much in demand as coffee, a special effort cannot be made to revive the culture in Ceylon on a considerable scale. We by no means lose sight of what is being done to conserve the area planted in Uva, notably Haputale; and still more do we recognise the enterprise which has marked the cultivation of a good-sized clearing of Liberian coffee in the Kelani Valley. May a full measure of success attend the experiment. But what is wanted to ensure further and wider attention to coffee, is surely that all interested in the product here, in India and at the Straits should unite to support the mission to import the ladybird beetles from Queensland to prey on the "bug" and other enemies of coffee. When this is done, there may be justification for new clearings in the hill-country as well as the lowlands.

But to turn to the other product, India-rubber, we can at once with a clear conscience urge its wider culture in our island as a subsidiary product to tea, if not in separate clearings. The demand for rubber in Europe and the United States is increasing every day. The uses for it are multiplying in all directions. The "Cycle" industry alone has created an immense demand. All the supply from the primeval forests of Africa as well as from the basin of the Amazon is not equal to the demand and must year by year now, become less so. One source of supply, Madagascar, is for a time cut off; and the exports from India and the Eastern Archipelago are not increasing. The price of raw rubber is firm if not steadily upwards. It is under these circumstances that we would urge increased attention to the species most desirable for cultivation in Ceylon. Some of the kinds originally tried here—the Ceara for instance—did not succeed so well as was anticipated, although possibly, sufficient time was not allowed for a fair trial. On the other hand, there are certain species, the *Landolphia* may be specified, which are likely to give a handsome return. It would be well if the Committee of the Planters' Association made inquiries as to what may be generally recommended to planters inclined to take up the cultivation. We know that British manufacturers of rubber goods are getting anxious about their supplies; and one large Company—the North British, alluded to in our letter from Glasgow,—may be sending out a Commissioner erelong to examine and report on likely new sources of supply, as well as to urge extended cultivation wherever practicable. Under such circumstances, Ceylon ought not to be behind in competing as a producing country—more especially because to diversify and divide our tea gardens with some suitable as well as profitable product, would be one of the best means of ensuring the continued prosperity of the great staple of our planting districts.

MARKET FOR TEA SHARES.

Sept. 10, 1896.

Business during the past week has been rather brisker than for the last week or two, the Stock Exchange official list showing as many as seven or eight different markings in one day. Prices on the whole keep firm, with a slight upward tendency.

Mincing Lane Market keeps steady, and biddings have been fairly active, teas with quality making very good prices.

CEYLON SHARES.

C. T. P. Co. Ordinary have changed hands down to 29¼, with shares now offering at 29¼.

Associated Company shares have again changed hands, the Ordinary and Prefs. together at 10¼, and the Prefs. alone at 10⅝.

Dimbula Valley Ordinary have changed hands at 6¼ and 6⅜, with possibly a few more shares to be had at the higher figure. There is no business to report in the Prefs., but shares might probably be had at a little over 6½.

Eastern Produce and Estates Ordinary are again said to have been done at 6⅝.

Ouvah coffee have been done at 12¼.—*Home and Colonial Mail.*

THE SUPPLY OF RUBBER.

The following article is from the Manchester *Guardian* of Sept. 11th. It shows that although Western Africa has greatly increased its export of rubber of late years, yet there is some danger of the supply henceforward falling off:—

"It is fortunate for the prospects of the cycle industry that the new supply of india-rubber from Lagos promises to be abundant. The "Kew Bulletin" publishes the latest intelligence of this fresh colonial product, which affords one of the most remarkable instances of rapid development of natural resources in our times. The "Kickxia Africana," wild forest-plant growing abundantly in the interior of Lagos from which the new rubber is derived, differs considerably from the tree furnishing the Brazilian rubber. It was discovered in Lagos in the latter half of 1894, and the first exports of any consequence were made in January, 1895. In that month the shipments amounted to 21,131 lb., valued at £1,213. Thenceforward there was a steady increase month by month, and in October last the quantity reached 1,059,158 lb., and the value £57,117, the returns for November and December showing only a slight decrease. In the whole of last year—the first of the existence of this trade—the exports from Lagos were 5,069,504 lb., of which the declared value was £269,892. The collection and preparation of this raw product are carried on entirely by means of native labour, and, although for a

time difficulties arose out of the claims of forest rights and transit dues on the part of the local chiefs, these appear to have been surmounted. Writing in the early part of this year to Mr. Thiselton-Dyer, of the Royal Gardens, Kew, the Acting Governor of Lagos stated that, according to prevailing opinion there, a considerable falling off in the export of india-rubber from the colony would be witnessed in 1896. He added, however, that no one was competent to give a trustworthy opinion on the subject. The production of rubber from the "Kickxia Africana" in Lagos was preceded by its manufacture from a similar plant in the Gold Coast Colony a few years earlier, where attention was first drawn to it in 1882 by Sir Alfred Maloney, then the Governor. In that colony the export, though declining a little after its initiation, is now well maintained, the amount imported from the colony into the United Kingdom last year having been valued at £246,160, besides that sent to the Continent and the United States."

INSECT PESTS.

To the Editor of "Indian Planters' Gazette."

Dear Sir,—May I, through the medium of your Journal, remind planters and others interested in agriculture that we are still, at the Indian Museum, carrying on our efforts to identify the chief insect-pests of this country—as well as the chief natural enemies of these insectpests—in the hope of ultimately producing systematic registers, or rolls, of the animals that affect each particular kind of crop whether by ravaging the crop or by preying upon the ravagers; and may I appeal to planters to kindly continue and extend their assistance to us in this enterprise by contributions of specimens and field notes. Such specimens should be addressed to the Superintendent of the Indian Museum.

In return for this assistance we can only hold out the final hope of providing a more or less complete account of the animals (chiefly insect) that affect—whether adversely or beneficially—each particular kind of crop or industry. We cannot test the value of insecticides or undertake the work of an agricultural experiment station, though we shall of course be happy to communicate, so far as we are able, the published results of exterminant experiments undertaken in countries where agricultural stations exist.
—Yours faithfully, A. Alcock,
Superintendent, Indian Museum.
—*Indian Planters' Gazette*, Sept. 16.

THE DYEING PROPERTIES OF JAKWOOD.

The Agriculture Ledger, 1896, No. 4, contains the following paper :—

The Constituents of Artocarpus Integrifolia. Part I. Contribution from the Clothworker's Research Laboratory, Dyeing Department, Yorkshire College, by Arthur George Perkin, F.R.S.E., and Frank Cope, Reprinted from the Transactions of the Chemical Society, 1895.

From this we quote as follows :—

Artocarpus integrifolia is the well-known jack-fruit tree, belonging to the Urticaceæ, a large tree cultivated throughout India, Burma, and Ceylon, except in the north. When freshly cut, the heart-wood is yellow, but this, on long exposure to air, gradually darkens, finally becoming of a mahogany colour. It is largely used for carpentry, furniture, etc., being considered one of the most handsome furniture woods used in the country, and is stated to be exported to Europe for this purpose. The rasped wood is used by the natives of India and Java as a yellow dye, in conjunction with alum, for colouring the robes of the Burmese priests, also for dyeing silk, and for general purposes.

A sample of this wood was brought to England by Mr. John Ingleby, late Chief Surveyor* of the Northern and North Central Provinces of Ceylon, who introduced it to the notice of Messrs. Wood and Bedford, of Leeds. This firm being anxious to test its utility as a dye-stuff, and, moreover, being struck by its resemblance to old fustic (Morus tinctoria), imported a considerable quantity from Ceylon, and to them our best thanks are due for a supply of material for the carrying out of this investigation.

A characteristic property of this dyewood, by which it may be distinguished from either old fustic or any other natural yellow dye-stuff that has come under our notice, is as follows. If an aqueous decoction be treated with dilute alkali, a yellow solution is obtained, and this, if gently warmed, assumes a beautiful blue tint, which, or standing, rapidly becomes green, and finally brown-yellow.

In a former communication (Perkin and Pate, this vol., 649) it was shown that though morin yielded acid compounds very similar to those produced from quercetin and other allied colouring matters, it differd from these in that during the formation of its sulphuric acid compound 1 mol. of water is eliminated. In order, therefore, to be quite certain that the colouring matter of jackwood was really morin, its solution in boiling acetic acid was treated with sulphuric acid. On cooling, an orange-red, crystalline mass separated, which was collected, washed with acetic acid, and dried at 110 deg.

The composition of the sulphuric acid compound, and a comparison of this and the hydrobromic acid derivative with those of morin obtained from old fustic, left no doubt as to their identity. The colouring matter of jack-wood is therefore *morin.*

Attempts to prepare acetyl and other derivatives have yielded at present unsatisfactory results, and this is no doubt due to its instability in the presence of most reagents. It is our intention to continue the study of this most interesting substance, but this work will of necessity be slow, for its isolation from the dyewood in any quantity will entail considerable time and labour.

As morin has been previously only known to exist in old fustic, and as this dye-stuff contains also a second colouring matter, maclurin, it was necessary to determine whether the latter also existed in jack-wood. Various tests, however, showed no indication of the presence of this substance; but in order to be quite certain, it seemed best to prove this indirectly by examining old fustic according to the methods employed with jack-wood.

A boiling aqueous extract of old fustic was therefore treated with lead acetate, the precipitate collected, and the filtrate, after removal of lead in the usual manner, evaporated to a small bulk. The dark-coloured liquid thus obtained was treated with excess of salt, filtered, the filtrate extracted with ethylic acetate, and the extract evaporated. The resulting sticky product showed no signs of crystallisation, and it was therefore dissolved in dilute acetic acid and allowed to stand some hours. A light yellow precipitate gradually separated, which was collected and purified by crystllisation in a similar manner, and this was found from its dyeing and other properties to be identical with maclurin. With lead acetate solution, it yielded a precipitate, but was not entirely thrown down in this way, and its isolation from old fustic in the above manner is due to the fact that its lead compound at first formed, is partially decomposed by the acetic acid which is simultaneously liberated from the lead acetate. On the other hand, morin is entirely precipitated by this reagent.

Jack-wood thus treated as here shown yields no substance having the properties of maclurin, and its non-existence in this dye-stuff is thus conclusively proved. Morin is consequently the sole colouring matter of jack-wood, and the cyanomaclurin which it contains occupies the place of the maclurin in old fustic.

As the dclute acetic acid filterate from the precipitated maclurin (see above) appeared to contain

* Indian Civil Service.

a second substance, it was evaporated to dryness, a dark-coloured sticky residue being thus obtained. When boiled with dilute alkalis, and aqueous solution of this product darkened somewhat in colour, but did not yield the characteristic blue tint formed when cyanomaclurin is thus treated. In a similar manner to the latter, however, it was decomposed by boiling dilute acids with formation of a red-brown precipitate, and evidently consisted of a substance not hitherto known to exist in old fustic. It gives no precipitate with lead acetate solution, and is therefore distinct from the tannic acid which according to Lowe (*Fresenius Zeitschrift für Analytische Chemie*, 14, 127), is present in this dye-stuff in conjunction with morin and maclurin. This substance will be submitted to examination.

DYEING PROPERTIES.

As was to be expected from the results of its chemical examination, jack-wood dyes shades very similar to those of old fustic, that is, olive-yellow with chromium, dull yellow with aluminium, and a brighter yellow with tin mordaunt. The results obtained, however, are somewhat disappointing when it is considered that its sole colouring matter is morin, for this by itself dyes fine bright shades, whereas those yielded by the wood are duller in comparison. This must be accounted for as due to the brown decomposition products of cyanomaclurin which are probably formed to a slight extent during the dyeing operation, and also exist in the free state in the dye stuff itself.

Experiments showed that the sample of jack-wood here examined contained only about one-third of the colouring matter of old fustic. It is, however, probable that this represents a poor quality, for that brought originally from Ceylon by Mr. Ingleby was found equal to old fustic in dyeing power.

TEA PROSPECTS.

To the Editor, "Indian Planters' Gazette."

Sir,—It must be reassuring to all those interested in Indian tea to have road in your issue of 5th instant, the bright prospects held out for this product. In these pessimistic times not a few of our older planters look askance and gravely shake their heads at the pending ruin shortly to overtake the industry. And now that so many mammoth gardens are being opened out, the anticipated catastrophe cannot be delayed much longer. "What," they say, "can be done with all this tea? Where can people be found to drink it? And where can markets be secured to relieve us of these extra million pounds?"

However, Mr. Editor, as these ill-omened prophesies have filled the air for well nigh twenty years, they can, like the witches in Macbeth, only affect those of gloomy and dark imagination, those whose judgment is swayed by a despondent phantasy, and now that "Capital's" letter has appeared in your columns, these wiseacres must feel not a little disconcerted at this gleam of hope and sunshine thrown out to encourage a vast and growing industry.

Had we no faith in British energy and no confidence in the rising importance of India as a field for commercial enterprise, we could not at this moment proudly look back at the marvellous development which has taken place in this industry during the last decade. From occupying a place of mere secondary importance, Indian tea has advanced with leaps and bounds and is now recognised as one of the prime factors in the export trade of the Empire and, if according to "Capital," within the next four years by "using the most energetic and prompt measures," it is possible to create a demand for Indian and Ceylon teas to the extent of over one thousand million pounds, then it is safe to predict that tea is yet a long way off from even the zenith of its greatness.

We all note with interest the active measures now being taken in opening out the American market and the satisfactory results obtained by Mr. Blechynden's exertions in that quarter. But at the same time, the Association ought to bear in mind that America is not the only market in the world that has to be opened out for our teas. Attention ought to be drawn to Russia, Persia, Turkey and Central Asia with all their teeming millions of people. Why should not agencies and depôts be established in these countries? Why should these people be denied the luxury of knowing what it is to drink a good cup of Indian tea? Let them but acquire the taste for our soothing beverage and they will find that life is well worth living. Besides, the continued use of our teas, will soon convince them that the Indian leaf has got properties peculiar to itself and cannot be surpassed or even equalled by that of any other country.

Prompt action ought at once to be taken to secure these outlets for our trade and every garden ought to contribute its share in helping to forward the works. Were the necessary funds forthcoming there would be no difficulty in securing first class men with a business capacity and knowledge suitable for advancing the interests of Indian teas in those centres now referred to. A Planter.

—*Indian Planters' Gazette*, Sept. 19.

THE NEW LONDON TEA MARKET (LIMITED.)

A winding-up order having been made against this company on July 29th last, the creditors and contributories met yesterday before Mr. A. S. Cully, Assistant Official Receiver, at the Board of Trade offices, Carey-street, Lincoln's-inn, for the purpose of appointing a liquidator. The circumstances connected with the company were of a somewhat peculiar nature.

Having disposed of the proofs, the Chairman said that approximate accounts had been furnished showing liabilities £6,429, of which £3,825 were unsecured, with assets £10. The deficiency as regards contributories was returned at £5,161. The company was incorporated on October 14, 1892, with a nominal capital of £5,000, divided into 2,250 proprietors' shares of £2 each, and 500 deferred shares of £1 each. It was formed for the purpose of buying and selling tea on commission. The promoter of the company was Mr. W. B. Neale, who entered into an agreement with the majority of the signatories whereby he was appointed managing agent of the company for ten years at a salary of £300 per annum. Under the articles of association Mr. Neale was entitled to exercise alone all the powers conferred on the directors. The agreement also provided that the consideration of the services rendered by him in connexion with the formation of the company, the latter were to pay him £875, to be satisfied by the issue of 250 proprietors' shares fully-paid up, and 500 deferred shares credited with 15s paid. The company started operations with a paid-up capital of £60, the working capital being provided by an advance of cash on deposit to the extent of £300. Mr. Neale acted as managing agent down to March 31, 1894, exercising sole control over the affairs of the company. On April 2 following his office was terminated by the appointment of a board of directors. The accounts appeared to have been very imperfectly kept while Mr. Neale acted as managing agent, and when the board of directors was appointed the company's position was not disclosed. A statement prepared in October, 1894, showed that a deficiency of £908 existed in March previously. The Company's operations from March, 1894, to December 31 following appeared from accounts presented to the shareholders on April 30, 1895, to have resulted in a loss of £76. The purchases of tea for that period

were represented at £19,497, and the sales at £18,444. An examination of the books during the preparation of the accounts referred to disclosed the fact that grave irregularities had been committed, and, as a result of further investigation, the bookkeeper was suspended, and Mr. Neale quitted the company's service. The latter subsequently agreed to pay £500 in discharge of any claim the company might have against him and, £200 was paid on account thereof, and the Company assigned the balance to a creditor for £200. In June, 1895, Mr. R. Sefton became the manager, and during his occupation of that office a number of what were termed "swopping" transactions were carried out; The nature of these dealings, which were represented as *bona fide* sales and purchases, appeared to have been an exchange of tea at fictitious values, in order to obtain increased advances upon the warrants. The result of these operations was that the company paid larger commissions and bonuses to the manager than he was entitled to, and the stock of tea (the warrants for which were held by the banks against advances) was largely over-valued. When any of the tea was sold the deficiency in the value had to be made up the Company before the warrants could be released from the bank. The accounts at December 31, 1895, presented in May last, showed a net loss for the year of £119, the purchases of tea being represented at £23,749, and the sales at £23,352. Inasmuch as the stock estimated at £3,939, was, in consequence of the "swopping" transactions, highly over-valued, the actual loss was much greater. The chairman of the Company (Mr. E. A. R. Ewen) had financially assisted the concern from time to time, and was now a creditor for nearly £1,200. The failure of the company was attributed by its officials to—(1) losses incurred through "swopping" transactions; (2) misapplication and misappropriation of the company's funds; and (3) mismanagement and bad debts. In concluding the chairman said that the registration of such a company was an abuse of the Companies Acts. It enabled the promoter (Mr. Neale) to trade without any personal liability, and at the same time to secure an income of £300 a year. That gentleman also received £875 in shares, and it was very difficult to see what consideration the company obtained for them, and he reaped the benefit of the business at the expense of the creditors. His nominees, to whom the shares were allotted, were appointed directors. The case was one which called for an investigation of a public nature, and the Official Receiver was determined that the utmost publicity should be given to it, and he therefore proposed to apply to the Court for an order to examine the persons connected with the company.

At the meeting of creditors no quorum was present, and an adjournment until the 21st was taken, the Chairman intimating that, in the event of no resolution being then passed, the matter would remain in the Official Receiver's hands.

The shareholders decided to leave the case with the Official Receiver, and the proceedings terminated.—London *Times*, Sept. 13.

THE LADY-BIRDS AGAIN.

One of the late issues of the *Ceylon Observer* contains some interesting notes on the Lady-Bird question. Incidentally reference is made to Professor Marshall Ward's distaste to the entire abandonment of Ceylon's first great staple, coffee. It will be remembered that this scientist, now permanently attached to the Scientific Staff of Cambridge University, first won his spurs by his careful working out of the Life History o *Hemileia vastatrix*. The following letters are then published on the difficulty of obtaining the lady-birds without their particular parasites.* * *

Mr. Ferguson then brings forward an admirable suggestion that, as most probably sufficient funds would not be obtainable among Ceylon coffee planters alone to defray necessary expenses, coffee men in South India, the Straits and Borneo should all come forward and help. We suppose that it is practically impossible to accurately gauge the annual loss caused by bug, but it must run to a very big figure indeed, certainly many times and probable cost of temporarily securing Professor Kœbele's services, some R15,000 at most. In urging the matter on our readers we are not advocating any general appeal for scientific aid of indeterminate value to the coffee industry. It is a very plain and business-like scheme. We think no one will accuse us of the slightest exaggeration if we put the annual loss of crop in South India from bug at half a lakh of rupees. From all the accounts hitherto published of the Kœbele experiments at Honolulu, bug can be absolutely wiped out. At a cost of some R15,000 at most, we would have a very good chance of effecting the same cleansing process in South India. The question is this: whether it is worth our while to spend R15,000 now and once for all, in order to save ourselves an annual loss of R50,000? There is of course no absolute *certainty* of the experiment proving quite so successful as it has in Hawaii, but there are very excellent chance of it so doing.

There is further every probability that if the Ceylon and Straits planters come forward, as the former are almost certain to do, the estimated R15,000 will be reduced to half that amount. It would certainly do no harm if the U.P.A. put itself into communication with the Ceylon P.A., and instituted enquiries as to the exact cost of the proposed investigations, and what portion of this the Island would be prepared to give. While committing ourselves to nothing, it would tend to clear the ground and bring matters to a head.

We had thought, when we first took up the subject, that the importation and subsequent distribution of these lady-birds would be a very simple matter. We consequently wrote for a consignment of the best varieties to be sent us from Queensland, which were promised us in due course. Up to date, however, we have heard nothing further from Australia, and now being no more conversant with the difficulties of the situation are almost glad that so far our efforts have been abortive. The lady-birds required have, it seems, certain parasites, which it imported with them, would render it impossible to obtain their necessary multiplication. To divest them of these unwelcome *attachés* requires special and trained aid.

Further, it appears that personal attention on the voyage out—as the insects must be kept on ice to preserve them in their dormant condition—is almost indispensable. Lastly, before successful distribution can be hoped for, they must be carefully watched and attended to for many weeks by trained scientists.

It is without doubt partly owing to these difficulties that Mr. H. O. Newport, whose name is so closely connected with the question in South India, has decided it would be better not to attempt any importation at all. It will be remembered that in his valuable paper read before the U. P. A., he advocated the encouragement of certain indigenous varieties that he discovered

eedi ng on the bug, and recommended that the services of a Government expert be called for to pursue his investigations. It is with diffidence that we venture to disagree with Mr. Newport in this matter, to which he has now for so many months given his closest attention. Yet we think that the very face of the species being indigenous militates against their value. They have all the conditions required for their speedy multiplications and consequent destruction of bug, so why is bug found at all in South Indian coffee? What is the factor that preserves the balance of nature in this instance? We would make a shrewd guess in suggesting that the presence of parasites will probably be found to have a great deal to do with it. We are strongly of the opinion that if Government aid be invoked at all, it should primarily be directed towards the importation of those varieties which have achieved such signal success in Hawaii. The matter, we think, is however essentially one for experiment—argument is more or less out of place. In conclusion we trust Mr. Newport will continue his important investgations, whether Government aid be obtained or not: the value of such original research cannot easily be over-estimated.

We may mention here that the late Dr. Nietner, in "The Coffee Tree and its Enemies" advertised elsewhere, published a description of the *Chilocorus circumdatus*, a kind of lady-bird parasite feeding on the Brown or Scaly Bug, generally called the Black Bug, *Lecanium coffeæ*. The work was printed in Ceylon in 1886.

Since writing the above we notice two communications of interest in the *Ceylon Observer*, the first one being a letter from Mr. Ernest Green, the author of the coming book on the Coccidae of Ceylon, on the subject of the fund. * * *

The next is a letter from the inevitable wet-blanket, whose remarks however it is only fair to publish as giving the other side of the question. Our contemporary, the *Observer*, it is needless to add, attaches but the slightest importance to the views of its correspondent.—*Planting Opinion*, Sept. 26.

BRITISH CENTRAL AFRICA CURRENT CHAT.

Pulping has been in full swing during the last month on all the low elevation estates.

We understand that Messrs. Foulkes and Pigott intend setting up their machine on one of the Lake Nyasa islands and treating *Sanserviera Cylindrica* (Ife Hemp) which is said to be abundant in awild condition on the Lake Nyasa islands. They have obtained a concession from Government for this purpose.

While most readers of *Life and Work* will be thankful for the medical notes at present appearing we fear some of the remarks will not be appreciated owing to their evident absurdity, e.g. the following:—

"The preparation of palatable coffee is a task which up to the present time has baffled the endeavours of most coffee-planters in British Central Africa," etc.

We have yet to learn that Dr. McVicar has sampled the coffee brewed by "most" coffee-planters in B. C. A. If he has he must have been doing little else since his arrival at Blantyre only some three months ago. Dr. McVicar is evidently anxious to place the results of his specialised training at the disposal of the B. C. A public and the effort is a laudable one. It is to be hoped therefore that he will not prejudice his readers by indulging in criticisms which are only the result of a three months' experience.

That a plantor's coffee may be bad is further not necessarily due either to incompetence or laziness. It may be due, we would suggest, to pressure of work. We have known missionaries whose coffee would not pass muster at a cooking school but the public put it down not to indolence or incompetence—but to their absorbing zeal for their work. Possibly the public may have been wrong but at any rate they felt it was a charitable verdict and so let it pass.

Civilization among the natives is certainly making headway. Malota, who has a coffee plantation out Midima way, is engaged in building a brick residence there of no mean proportions.

Mr. Schippers is confident that when the people of Holland know more about the possibilities of B. C. A. as a coffee growing country they will not be slow to invest in our staple product.—*Central African Planter*.

CRITICISMS ON BRITISH CENTRAL AFRICA.

We publish in another column a letter written to the *Zanzibar Gazette* in reply to criticisms made by Mr. Rhodes Morgan, Deputy Conservator of Forests, I. F. S. on B. C. A. Mr Morgan was interviewed by the *Bombay Gazette* and his chief points against the country were, (1) that it was malarious, (2) that leaf-disease might break out, (3) that the discovery of gold would ruin our labour supply, (4) that cattle manure was almost impossible to get and artificial manures were out of the question owing to high freights. As the rejoinder points out these criticisms are easily discounted and they shew but a superficial knowledge of this country. The only point which is really serious is the menace to our labour supply should gold be discovered. It is not however likely to be found in B.C.A. and should it be discovered in payable quantities in the B.S.A. Coy's territory a wise Administration could easily frame such regulations as would prevent the disorganization of our labour supply. The B.S.A. Territory, unlike the Rand, has a native population of millions to draw from so that it would not be necessary to recruit labourers in B. C. A. Such criticisms as Mr. Morgan's may do some good in keeping the wrong sort of man out of the country for B. C. A. is no place for "armchair" planters. Under a wise and beneficent government there can be no doubt that B. C. A. will become one of the foremost states in Africa. We have a unique geographical position; the country is at such an elevation as to make it fairly health and development will make it healthier still; we have high plateaus suitable for sanatoriums within easy reach of nearly every part of the protectorate, we have already got telegraphic communication and a railway is certain within the next three years. All that is required is capital and energy, the one without the other will not suffice, but the prospects for the two combined are of the best. In saying "all that is required" we are assuming that we have a government suited to the country. This however is at present by no means the case and the sooner the present provisional form of government is changed for a more permanent one with a properly organised civil service the better for the country. It is rumoured that Sir Harry Johnston will not return and so far we have not heard anyone deplore the possible contingency. If the rumour proves correct we also hope it will mean the end of the present autocratic form of goverment and the beginning of a new regime.—*Central African Planter* for August.

WYNAAD TEA.—The development of tea in this district is proceeding apace, so fast in fact that a recent Ceylon visitor was sadly seared. He returned to the Island with words of woe and warning, declaring that it would be sheer madness for Ceylon men to think of extending, with Wynaad tea expanding so "visibly." However, while the sun is shining, wise men mean to make their hay, and there is a very brisk enquiry reported for Wynaad tea lands by Island planters, whom a stern Government nonsuits in their own country.—*Planting Opinion*, Sept. 26.

THE DECLINE IN QUININE.

T'is said that the unexpected often occurs. The saying proved its truthfullness on Monday in the decline of three cents per ounce in the price of quinine, which was published exclusively in the Reporter of that date. The announcement was quite unexpected, and took the trade completely by surprise. All of the local conditions governing the market had pointed to a firm price and an increased demand as the season of large consumption advanced. Already signs of activity had appeared, and the trade had begun to feel encouraged at the promising outlook. In anticipation of a steady market, purchases were made in London late last week, so it is reported, at a price equal to twenty-five cents laid down here. During Monday the market was demoralized, but the dealers soon became reconciled to the situation and fixed their selling price at twenty-four to twenty-four and one-half cents per ounce, as against twenty-five cents per ounce, the lowest price quoted for bulk by the manufacturers. The prices of dealers and manufacturers now bear the same relation to each other that they did just previous to the advance of Dec. 18, 1895.

The trade is at sea as to the reason for this radical move of the manufacturers, and no explanation has been forthcoming from the latter. All is conjecture, but an analysis of the situation may help to reach a conclusion which time may prove to have been the correct one. It is known that the order to reduce the price came by cable from Germany on Thursday previous to the date set for the new price to take effect. One theory is that at the prices, which the makers had been quoting for eight months, there was a temptation for others to start new works, as it is well known that quinine pays a substantial profit even at present prices; hence, it is argued, it was determined by the manufactnrers to anticipate any such move, should one be in contemplation, by lowering the price and thus dissuading any possible maker from entering the lists. It is barely possible that the much-talked-of Java factory is feared, but this seems hardly probable as it will require a long time to establish a new brand of quinine, and nobody knows this better than the manufacturers.

For some time past it has been apparent that a feeling of mutual distrust has existed among the makers. Just how far back this dates, we are unable to state with any degree of accuracy. Certain indications, however, point to about the time of the advance of last December. At that time at least one of the manufacturers booked a large number of unsolicited contracts at twenty-five cents, which were accepted by the consumers as soon as they learned of the contemplated advance, a notice of which, most of them received in the mail following the one that carried the advice of the booking of their contract. This was looked upon at the time as rather sharp practice. All of the manufacturers made large sales and the importations to cover the contracts entered into were very large. During the first three months of this year they amounted to 1,335,328 ounces at New York alone, as against 1,308,959 ounces for the United States during the fiscal year ending June 30, 1895. The importations at New York for the fiscal year ending June 30, 1896, were 2,913,280 ounces, by quarters, as follows: From July 1 to October 1, 1895, 335,810 ounces; October 1, 1895, to January 1, 1896, 929,585 ounces; January 1 to April 1, 1896, 1,335,328 ounces; April 1 to July 1, 313,357 ounces. Into the United States for the fiscal year ending June 30, 1896, the total importation of quinine and other salts of cinchona, was 3,359,818 ounces, the largest importation in four years. Then, too, the imports of bark show a material increase. When we take these facts into consideration, in connection with what stock of alkaloid is held by dealers, not large, to be sure, the conclusion is forced upon us that the importations were considerably in excess of the demand. Manufacturers have been large buyers of bark at all of the sales in Amsterdam for several months, and they have probably overstocked themselves, and they have ascertained that there was too great a difference between their price and the price quoted by dealers, who possessed just enough, both here and in London, to control the market. Much of the stock in outside hands is high priced, even that held by late purchasers, hence this latest move of the manufacturers may be considered a master stroke to enable them to market their product and effectively bottle up the dealers or force them to sell at a loss. At the same time it will probably have the result of putting a stop to the leak within their own ranks abroad, if they have thoroughly satisfied themselves that it really existed, and it may discourage the practice of filling up the consuming trade beyond their requirements by persuading them that the price was likely to advance. Another decline is not improbable.

We append tables which picture clearly the situation from a statistical standpoint:—

AMSTERDAM BARK SALES.

	Ounces in bark offered	Ounces in bark sold	Price paid per unit Cent
1895			
January ..	1,148,222	755,313	·98
February ..	1,360,688	702,736	.91
April	839,661	263,578	1·04
May	910,016	612,169	1·06
June	753,353	576,541	1·04
July	950,400	601·885	·99
August	1,043,293	774,400	·95
October	780,679	665,913	1·05
November ..	1,073,600	774,400	1·05
December ..	880,000	827,200	1·09
1896.			
January.. ..	1,143,126	955,958	1·10
February ..	1,286,877	953,638	1.00
March	1,158,112	942,374	1·00
April	1,017,245	957,904	1·00
June	901,718	828,080	1·00

CINCHONA BARK IMPORTS.

Year.			Pounds.
1890-91	..	..	2,672,364
1891-92	..	..	3,123,941
1892-93	..	..	2,374,041
1893-94	..	..	2,502,224
1894-95	..	..	1,911,489
1895-96	..	..	2,706,006

QUININE IMPORTS.

Year,			Ounces.
1890-91	..	..	3,079,000
1891-92	..	..	2,686,677
1892·93	..	..	3,027,819
1893-94	..	..	2,141,130
1894-95	..	..	1,308,959
1895-93	(and salts)	..	3,359,818

In the last two tables the figures are for the fiscal years from June 30 to June 30.—*Oil, Paint and Drug Reporter.*

PLANTING AND PRODUCE.

The Decline of British and Indian Trade with Central Russian Asia.—An official report from our representative at Khorassan on British and Indian trade with Central Russian Asia, or what is left of this trade, will shortly be issued. The heavy Customs duties levied all along the Russian frontier line from the Caspian to the Pamirs are proving an all but impassable barrier for the British merchant. The green tea trade, which used to reach Russian Turkestan and Khiva from China by Bombay and Persia, is now taking the Batoum route. Piece goods cannot cross the frontier, though right up to the Russian line, British and Indian piece goods carry all before them, in spite of Russian competition. Black tea still takes the old route by India, though Russia is now growing her own tea successfully on the hills around Batoum, but our consul at Meshed thinks that this cannot compete with good Indian tea if that is sent to Khorassan. At the same time trade beyond our north-western Indian frontier, where it does not come into contact with Russian Customs duties, is increasing, and this is especially the case with imports from the countries beyond Cashmere and from Afghanistan. In Chinese Turkestan there are no import or export duties. But the main change in trade in the last few years in this region is that British merchandise now finds its way into Central Asia not through Afghanistan, as it formerly did, but through Cashmere, thanks to the Russian barriers on the northern frontier of Afghanistan.

Some Reasons Why.—It is not surprising that the coffee planters of Madras are inquiring into the question why the consumption of coffee has declined of late years, and is still on the down grade, while teas have increased so much in popular favour. There are several reasons for this, and briefly, they may be summed up as follows:—Coffee is not easily made, it is not so easy to procure pure as it should be, and few cooks of British training know how to turn coffee into anything else but a liquid mess from which the flavour has departed. But in the comparison with tea there are other causes to take into account. Coffee planting as an industry has no representation in London. It would be idle to deny that the tea industries of India and Ceylon have benefited immensely by the organisations here which have fostered the development of tea planting, and in various ways stimulated interest in British grown tea. At the Royal Colonial Institute, the Society of Arts, and elsewhere there have been valuable and instructive papers read about tea. Its praises have been chanted loud and frequently. Advertisement in all shapes is necessary in these times, and the tea industry has benefited enormously by the advertisement, it has received not only from the organisation we have mentioned, but by the many forms of dealers who advertise. Coffee planters, on the other hand, have nothing to tickle the public with. There is no special mark or brand of coffee known outside the trade. The public do not care a rap whether the coffee they drink is Brazilian or Mysore. There is a distinct opening for coffee specialists at home who would make and advertise certain blends or select certain districts. The coffee planters would find organisation and representation at home useful, but even then we doubt very much if coffee will ever prove a serious rival to tea, because of the difficulty the humble consumer finds in making it ready for use as compared with tea. As the medical faculty has been quite impartial in its attacks on tea and coffee neither product scores over this point. The art of coffee making is either a lost one or it has never been found in these islands. A Coffee Planters' Association in London, representing the interests of coffee growers in India, Ceylon or any other British possession, might find some useful occupation, and help to give the fillip to the con- receiving good value for his money but he is su[p-] porting a British industry. Those who attach w[...] to sentiments of this kind say that this feelin[g] been very pronounced in the case of Indian [...] Ceylon tea. That there is no feeling of this [...] where coffee is concerned receives an illust[ration] this week by the publication of the prospect[us of] the Dumont Coffee Company, Limited, in [...] the names of Messrs. P. R. Buchanan, H. K. Ru[...] ford, and other gentlemen interested in India[n] Ceylon tea, appear as directors of a Brazilian [...] company. If this prospectus referred to a con[...] for the cultivation of tea, say, in China or [...] America, such susceptibilities might be ruffled, b[...] applied to coffee it is a point which calls f[...] special comment. Coffee planters have not cl[...] topographical or geographical consideration, be[...] they would have found it very difficult to d[...] Puerile as the idea may seem to some, and di[...] as it is to carry it to any practical end, it [...] theless serves as an instance marking one o[...] disadvantages under which the coffee planter s[...] The consumer of tea whose inclinations a[...] favour of fervid patriotism is proud of the [...] that he is drinking tea produced in the B[...] Empire, and although his feelings might be su[...] if he were paying more for it, and getting [...] value in the case of Indian and Ceylon [...] he congratulates himself that he is fost[...] economy and sentiment at the same time. [...] the case of coffee there is nothing of this kind. [...] description of coffee is as good as another t[...] consumer without special knowledge, who only [...] that the cup of coffee placed before him be [...] by some one who knows how to accomplish th[...] but who outside this aspiration cares naught [...] the berry comes from. Perhaps coffee planters [...] consider whether it is worth while to work up a[...] sentiment on the subject.

"Futures" in Produce.—An English transl[ation] of the book entitled "The Ruin of the World's [Agri-] culture and Trade," by Dr. G. Rühland, pro[fessor] of political economy at Zurich, has just been [...] by Messrs. Sampson Low & Co. The volum[e has] been annotated and supplied with a preface b[y] Charles W. Smith, a Liverpool broker. In the[...] it is urged that the demonetisation of silver [...] no way affected prices, but that it is the "fictit[ious] dealings in "futures" which have been the [...] cause of the phenomenal fall. It is apparently [con-] tended that the interests of the speculators te[nd to] make such transactions continuously "bear" o[pera-] tions, regardless of the actual economic or stati[stical] position of the particular commodity relieved [...] occasionally by a "corner" equally disadvanta[geous] to producer and consumer. Indeed, it appea[rs to] be contended that the fall in silver itself is [...] dealings in "futures" in that metal. Mr. Smit[h and] Dr. Rühland appear to believe in the [...] bility of and an international agreement to [pre-] vent gambling in "futures." Such an agre[ement] would not prevent competitive importatio[n of] Argentine and Indian wheat for sale at re[duced] gold prices whenever exchange fell; nor cou[ld it,] as matters stand, prevent actual sales of silver [at re-] duced prices for the express purpose of lo[wering] the exchanges.

The Diminishing Tea Trade of China.[—The] British Acting Consul at Kiukiang reports th[at the] great feature of the season has been the large[ly in-] creased export to Russia and the continued de[crease] in shipments to England. British growths [of] India and Ceylon have almost ousted China [tea] from the London market, and the merchant[s look] for even a smaller export to England durin[g the] present season.

Dock Dues on Produce.—The notice of an in[crease] in dock dues on the part of the dock compani[es has] caused some excitement amongst London merc[hants]

spirits, teas, tobacco, and wines Some of the leading wharfingers have arranged to put lighters alongside the incomming vessels to take charge of goods at once on their arrival, instead of storing them on the quays.

AWKWARD FOR THE DOCK COMPANIES.—Referring to the subject of dock charges, Messrs. Cayzer, Irvine and Co., the proprietors of the Clan line of steamers, have quietly inaugurated a new scheme for the unloading of their vessels, which, if imitated to any considerable extent, may seriously affect both dockers and dock owners. The matter has been brought to a head by the recent action of the London Docks Committee in raising their charges for landing cargo on the dock quays. One example will suffice. The dock charges on a Calcutta cargo amount to 5s a ton in London, as compared with 1s 10d a ton at Liverpool; but whereas at Liverpool the consignee pays the landing charges, the London consignees refuse to do so, as they wish to warehouse their cargo at their own wharves. Finding that the consignees cannot be coerced, the dock companies are seeking to impose the extra charges on the shipowners. But the latter declare that it is impossible for them to pay a sum which is in many cases equal to half the current freights, and Messrs, Cayzer, Irvine, and Co. have decided to avoid the docks altogether, pending an amicable adjustment of the dispute. Thus the "Clan Macneil" discharged at Mill Hole Pier and the "Clan Macleod" at Butler's Wharf, while the "Clan Macintosh," following the example of the "Clan Matheson" and the "Clan Ross" is now unloading "overside." These vessels have all arrived since the beginning of the present month. The "Clan Fraser," which is next due, will discharge in the river, and arrangements have also been made for handling the cargo of the "Clan Forbes," the "Clan Cameron," and the "Clan Grant" without the ships entering dock. This new departure has caused some delay and inconvenience, but it is believed that when the staff become accustomed to the new system as good despatch will be secured as at the docks, and when the projected deep-sea wharves are erected the greater portion of the London traffic should be dealt with much more cheaply than under existing dock arrangements. The object which the dock companies have in view is said to be to force consignees to warehouse goods at the docks instead of standing to private wharves, where the charges are more reasonable.—*Home and Colonial Mail*, Sept 18.

GOVERNMENT CINCHONA PLANTATIONS, NILGIRIS.

From the annual Administration report on the Government Cinchona Plantations, Nilgiris, for the year ending 31st March 1896, by Mr. D. Hooper, Government Quinologist, Government Cinchona Plantations, &c., Nilgiris, we make the following extracts:—

GENERAL CONDITION—(*a*) *Dodabetta.*—This plantation, in the opinion of Dr. King, is the most valuable of all those possessed by Government on these hills in consequence of the large number of crown bark or quinine yielding trees growing there. The natural situation of the plantation after a trial of thirty-five years has proved itself to be adapted for the successful growth of this kind of cinchona, and one of the elements of success might be attributed to the good management of the estates under the present Superintendent. Ninety-one thousand and four hundred pounds of bark were collected during the year from the coppicing of 12½ acres and various thinnings. The severe frost of January, which killed over 3,000 trees in No. I plot, rendered compulsory the harvesting of a large quantity of bark from this part of the estate. It has become difficult to know where to take the crop on Dodabetta, as some of the oldest trees still respond to high cultivation by giving richer bark, and in very few plots are there any trees in such a sickly condi- years, and the bark of which contains a maximum amount of quinine owing to the liberal application of manure to the land about two years previously. A row of these trees is cut out, and the bark harvested, and the stumps of the trees trimmed as in ordinary coppicing. The next row of trees is left standing, but the alternate rows are all cut down until the boundary of the plot is reached. The trees that are left continue to grow, and the bark thickens, and at the same time they afford shade for the young coppice shoots. When the shoots are sufficiently advanced, the old trees in their turn will be ready to be coppiced and barked, and the succeeding coppice shoots will have shade and protection provided for them. It has been found that the entire coppicing of a plot often results in failure due to the absence of suitable protection for the young shoots.

(*b*) *Nedivattam.*—A large quantity of dry bark, amounting to 91 600 lb., was taken during the year from different varieties of cinchona trees growing on this plantation. There is a great variation in the weight of bark yielded by the different species; for instance, the succirubra trees on the old plots yielded on an average 33 lb. of green bark per tree, some large magnifolias 27½ lb., the officinalis 9½ lb., and some young hybrid 2½ lb. A number of the older succirubra and magnifolia trees were cut down, not so much for their bark, which does not perceptibly increase in value after a certain age, but for their wood, of which a large stock is needed for fuel in the factory. Over 8,000 renewals were put out during the year, and about 38,000 failures were restored in the younger portions of the estate.

(*c*) *Pykara*—(1) *Hooker.*—The young trees on this estate are doing very well; but some of the larger trees on the ridge have a sickly appearance. Some of the trees that were coppiced in 1894, because of their dying condition, have thrown out shoots; but these appear to be unhealthy, and some have died out. The part of the estate, where these trees have been growing, is in an exposed position, and the soil is not of the best description. A belt of blue gums will be allowed to grow up and form a shelter for this plot, and the land will be well manured before any serious work is again undertaken here. Seven thousand seven hundred and fifty officinalis plants were put out during the year.

(2) *Wood.*—In accordance with the suggestion of Dr. King, who inspected this estate in July, and an order from Government (G. O., No. 5141, Revenue, dated 19th December 1895), instructions were issued to abandon this estate. All the trees were cut down uprooted, and the bark was harvested before the end of the year. A fire broke out in the estate in February and cleared the ground of the leaves and twigs of cinchona, and thus made the work of abandonment complete. The number of trees uprooted were 20,484 hybrids and 110 succirubras, and the amount of bark taken from them was 130,025 lb. of green hybrid bark and 1,320 lb. of red bark.

MANURE.—All the estates are well provided with manure. The Dodabetta estate received 1,187 cart-loads from Ootacamund in addition to 300 loads from the cattle sheds. Three hundred loads of manure were put out at Pykara and 100 loads at Nedivattam. A ton of Trichinopoly phosphate in powder was last year applied to the land where some of the young plants needed a tonic. The poverty of Nilgiri soil in phosphoric acid has often been made the subject of remark, and the addition of phosphatic manure to land planted up with cinchona is now regarded as necessary.

A few interesting experiments were made on some grown bark trees at Nedivattam, which showed to what extent the bark is enriched by good cultivation. In the year 1890 some five years old trees in plot 14 were manured and trenched, and a sample of the bark taken at the time gave 3·73 per cent. of sulphate

Again, in 1890, plot 21 was trenched and manured; the trees were eigh years old and their bark yielded 3·23 per cent. of sulphate of quinine. In 1894 the land was subjected to deep digging, and in 1895 the bark from the trees analysed 6·68 per cent. of sulphate. A sample of bark from plot 27 which had been treated in a similar manner as plots 11 and 21 gave 5·22 per cent. of quinine, which is above the average composition of crown barks.

The analyses of some barks from the Dodabetta Plantation show that, in some cases, the stimulating effect of the manure is only temporary. A large number of trees were some years ago manured with fish, cattle dung and bone meal. The best results were obtained in plot 30, where fish had been applied in the proportion of 2½ pounds to a tree. The barks were analysed in 1890, or two years after the manure had been put down. No manure has been given to this plot since that time; but to see if the richness had been maintained, a sample of the bark was analysed in October 1895, with the result that there was a decided diminution of alkaloids.

The following are the analyses referred to:—

	1890.	1895.
Quinine	6·27	4·01
Cinchonidine.. ..	1·39	·68
Quinidine	·11	·12
Cinchonine	·20	·23
Amorphous	·24	·37
	·8·21	5·41
Sulphate of quinine	8·43	5·39

Nurseries.—All the nurseries were well stocked with seedlings and Plants of *Cinchona officinalis.*

Crop.—The quantity of bark harvested during the year was as under:—

	lb.	lb.
DODABETTA.		
Crown bark ..	91,400	91,400
NEDIVATTAM.		
Crown bark ..	37,015	
Red bark ..	30,359	
Hybrid bark ..	27,226	
		94,600
PYKARA—(WOOD).		
Red bark ..	440	
Hybrid bark ..	43,260	
		43,700
Total ..		229,700

There remained in stock at the beginning of the year 195,129 lb. of bark; this, with the quantity harvested during the year, made 421,829 lb. Of this quantity 234,457 lb. were disposed of during the year, detailed thus—

	lb.
Used in the factory for the manufacture of quinine and fabrifuge.. ..	233,800
Supplied to Bombay Medical Stores ..	500
Supplied to private parties	157
Total ..	234,457

leaving 190,372 lb. in stock in the godowns at the close of the year.

Factory.—The manufacture of quinine and febrifuge was carried on continuously during the year until the end of February, when the fusel oil ran out. At the usual rate of consumption the oil would have lasted to April; but in October the work of the factory was very much increased, and the chemical were used in larger quantities than was foreseen at the beginning of the year. The fusel oil was ordered in November, and request was made to have it sent out by the end of February; but it has only just arrived.

The following statistics exhibit the outturn and sales of quinine and febrifuge since the manufacture was first commenced in June 1889, or during the past seven years:—

OUTPUT.

	Quinine.	Febrifuge.
1889-90	234	357
1890-91	2,928	1,050
1891-92	4,425	3,174
1892 93	4,933	3,139
1893-94	2,000	5,775
1894-95	4,770	1,756
1895-96	3,600	2,284

SALES.

	Quinine.	Febrifuge.
1889-90	234	7
1890-91	1,356	200
1891-92	3,344	3,017
1892-93	3,204	2,608
1893-94	2,536	3,513
1894-95	3,631	3.956
1895-96	5,644	2,666

The rate at which quinine was sold during the past official year was R14 a pound for Medical Stores and R16 for the public.

Taking the rate of R14 per pound for quinine and R10 for febrifuge, the value of the stock at the close of the year was R56,221, calculated thus:—

	R.
2,880 lb. of quinine at R14 per lb. ..	40,320
1,564 lb. 12 oz. of febrifuge at R10 per lb.	15,640
21 lb. 12 oz. of cinchonidine sulphas at R12 per lb. ..	261
Total ..	56,221

Government has recently decided to raise the price of quinine to R18 a pound for sale to the Medical Stores and the public, but the price of febrifuge will remain the same for the official year 1896-97.

Quinine.—The quantity of quinine turned out at the factory at Nedivattam was 3,600 lb., there remained in stock at the end of the previous year 4,984 lb., making in all 8,584 lb. Of this, 5,644 lb. were distributed as follows:—

	lb.
Issued to the Medical Stores Department, Madras ..	1,000
Do. do. Bombay..	1,080
Do. do. Bengal ..	1,500
Sold to the Local Fund dispensaries and Municipal hospitals	
Sold to Superintendents of District Jails ..	
Sold to the public	2,064
Sold to the Native States of Mysore Pudukkottai, Karbhari-Janjera	
Issued for paper packets of quinine powders to Collectors, Post offices, &c. ..	
Total ..	5,644

and there thus remained in stock at the end of the year 2,880 lb., excluding dryage.

As evidence of the expansion of the distribution of quinine by this office during the past official year, quinine was asked for and sent out to the Native State of Karbhari-Janjera in Scinde (north-west of India), to Tinnevelly (south), to Bombay (west), to Ganjam (east). The Bengal Government has taken 1,500 lb. of quinine for Calcutta and the Medical Storekeeper, Main Mir. The Province of Burma, too, has drawn its supply of quinine from Madras.

Febrifuge.—The quantity of febrifuge manufactured at the factory during the past official year was 2284 lb., there remained in stock at the beginning of the year 1,946 lb., making in all 4,230 lb. Of this quantity, 2,666 lb. were disposed of as follows:—

	lb.
Issued to the Medical Stores Department Madras..	500
Do. do. Bombay..	1,500
Issued to Local Fund and Municipal dispensaries, Sold to Native States and to the public ..	666
Total ..	2,666

and there thus remained at the end of the year 1,564 lb

In G.O., No. 2382, Local and Municipal, dated the 17th November 1894, communicated to this office under G. O., No. 4720, Revenue, of the 1st December 1894, Government ruled that Local Fund and Municipal hospitals should, from the commencement of the official year 1895—96, obtain their quinine and supplies of other medicine independently of the Madras Medical Stores Department, and that the quinine and febrifuge required should be obtained by these institutions from the Cinchona Department. This office therefore has practically been doing the work hitherto carried on by the Medical Stores Department, Madras, by distributing the quinine and febrifuge indented for by the several Local Fund and Municipal dispensaries, and by recovering and adjusting separately the value of each indent. This has added very materially to the work at the Head office, for, in addition to the above, the despatch of quinine powders to Collectors and Forest officials and Post offices, the sending out of quinine and febrifuge to the Medical Stores Departments of Madras, Bombay and Calcutta, and the public, was attended to. The unusual pressure of work in the office was cheerfully borne by Mr. D. Campbell, the Manager and his staff, who performed their duties most diligently during the year. The Manager was also in charge of the accounts and correspondence of the Gardens during Mr. Jamieson's illness and until the appointment of the new Curator in February.

The Quinologist's Report.—This report is not submitted separately this year; many of the results obtained from the experiments made in the laboratory will be found in other portions of this and the Administration report of the Government Gardens.

Miscellaneous.—(*a*) *Purchase of fresh Cinchona seed.*—In last year's report it was pointed out that cinchona plants now raised from the oldest officinalis trees, and those of the purest type, are not so vigorous or lasting as plants raised from seed taken from those trees ten or twelve years ago. A disease similar to canker sets in when the young plants are about two years old and just when they are ready for planting out. For this reason it appeared desirable that some fresh seed should be obtained from the home of the cinchonas in South America. The Secretary of State referred this question to the Director of the Royal Gardens, Kew, who discouraged the idea of securing seed from South America, and suggested that it might be supplied by the Jamaica Plantations where crown bark trees are almost naturalized and seed freely. The Director of Public Gardens and Plantations, Jamica, reported through the Colonial office, that he would do his utmost to comply with the request for ten pounds of seed; but considering the question of the probable supply from there, he thought it not at all likely that quantity could be supplied, as the seed to be of any value should be obtained from mature trees; and it is extremely light, the number of trees that would be required to give such a large amount was probably larger than they possessed of that kind. About two pounds of seeds have been received from Jamaica, and they will be carefully sown in the glass houses in the Government Gardens.

(*b*) Alkaloidal Composition of bark when kept in store for a number of years.—In March last the District and Medical Sanitary officer, Kistna, sent some powdered cinchona bark which he had received from the Treasury Deputy Collector of the district in whose office it had stored away for the past seventeen years, and he asked for an opinion on its condition before using it. An analysis showed its composition to be 5·4 per cent of total alkaloids and 1·1 per cent of quinine, a result which corresponded with the composition of succirubra bark; and as the bark did not appear to have deteriorated, the District Medical officer was informed that he could safely use it for medical purposes.

Reference to the Quinologist's report for 1885—86 shows that even mouldy bark in a state of powder does not deteriorate when kept in a damp situation for nearly a year.

(*c*.) Issue of quinine powders to the Collectorates.—The number of packets issued during the past year has been 2,638, of which 2,399 went to the Collectorates and 239 were sold to the public, against 1,805 packets disposed of in the previous year. These figures show an improvement, considering that the scheme has had to compete with the sale of the powders by Postmasters. In accordance with paragraph 2 of G. O., No. 224, Revenue, dated the 7th March 1893, a separate report on this matter will be sent in on the receipt of the necessary information from the Collectors—*vide* also paragraph 2 of G. O., No. 129, dated the 20th March 1896.

(*d*) Supply of quinine powders to the Province of Coorg.—In September last the Chief Commissioner of Coorg, acting on the advice of the Civil Surgeon of the Province, proposed to Government that quinine powders might be sold at the different Post offices in Coorg, where there were no dispensaris. The envelopes for these powders were printed in Canarese and English. In January last five packets of 102 powders each were sent to each of the twenty-two Post office, in the Coorg Province, but, so far, no indents from the Postmasters of this district have been received.

(*e*) Issue of Quinine Powders for Sale by the Postal Agency.—It having been finally decided by Government that the permanent advance of these packets to Postmasters should be five and the minimum indents three (G.O., No. 356, Revenue, dated 12th June 1895), the necessary amount of quinine powders in July was sent to the 315 Post offices in the five districts selected by the Board of Revenue, viz., Ganjam, Vazagapatam, Cuddapah, Kurnool and Malabar. In G.O., No. 4148, dated the 21st October 1895, Revenue a report was called for on the results of sales by the Postmasters up to the 30th November, 1895. This was done, and in G.O., No., 11, Revenue dated the 11th January 1896, Government considered that the experiment was on the whole a success, and that the introduction of the system into the other districts should not be delayed. In conjunction with the Postmaster-General, arrangements were made for supply of the quinine powders to the remaining fifteen districts in the Madras Presidency. After obtaining the necessary printed covers from the Government Press, Madras, the permanent advance was sent in March to 334 Post offices in the Telugu districts of Anantapur, Kistna, Godavari and Nellore. The distribution of quinine powders to the Tamil districts of the Presidency is now going on. It is estimated that the number of packets issued as permanent advances to Postmasters and to Collectors has been 6,053—

To first five districts ..	1,635	
,, four Telugu districts ..	1,670	
,, Coorg..	110	
		3,415
Issued to Collectors, &c. ..		2,638
Total ..		6,053

In addition to this number, indents were sent in subsequently by Postmasters for 664 packets, and these, if added to the above, would make the total number of packets issued in the year to be 6,717 packets or 679,858 powders.

Distribution of Quinine in Bottles.—In October last the Deputy Collector, Godavari, addressed this office regarding some bottles of quinine which had been sent to him by the District Forest-officer. Quinine in bottles is not so popular with the people in the district as the powders now being sold by him, and he wished to know if it could be sold by public auction. He was informed that, rather than sell it by auction, it would be preferable to send it to this office for making up into powders.

Supply of Quinine to the Burma Government.—The issue of three hundred-weight of quinine made up in five-grain powders to the Burmese Administration could not be effected before the close of the previous official year 1894-95, owing to the delay of the Chief Commissioner in selecting the form of envelope to be adopted. As soon as the Superintendent, Government Press, supplied the necessary

covers printed in Burmese and English, the three hundred-weight of quinine in five-grain powders or 479,906 powders were sent in August, September and October last, to the Superintendent of the Central Jail, Rangoon, and the value, viz., R5,073-10-0 was adjusted through the Accountant-General in the accounts for the year.

(*i*) VISIT OF DR. G. KING TO THE NILGIRIS.—In June last Brigade-Surgeon-Lieutenant-Colonel G. King of the Botanic Gardens, Calcutta, was invited, through the Government of Bengal, to conduct a thorough examination of the several Government Cinchona Plantations on the Nilgiris and the quinine factory at Nedivattam, and to report on their general condition their value, and the best way in which they should be worked in the future. Dr. King arrived in Ootacamund on the 20th July 1895, and inspected all the plantations in company with Mr. Lawson, and conferred with Government about the future organisation of the Botanical and Cinchona Departments. Dr. King was able, during his visit, to complete his report on the results of the inspection, and he left the Hills on the 8th August.

(*j*) DEATH OF MR. LAWSON.—It is with great regret that the death of Mr. M. A. Lawson, Government Botanist and Director of the Cinchona Plantations, has to be recorded. Mr. Lawson assumed charge of the Cinchona Plantations and Government Gardens and Parks on the 18th June 1883, and the designation of Government Botanist and Director was given to him on the 1st April 1886. Mr. Lawson had unusual ability which he exhibited in every department of his office. In January 1895 he intimated his intention to retire from service, and at the close of the year his health, which had been most robust during the whole of his Indian career, began to fail. In February last he reluctantly placed himself under medical care, and was removed to Madras, where he died after an operation on the 14th February 1896.

APPENDIX.

Report on the Cinchona Plantations and Factory of the Madras Government.

1. I have, during my present visit to the Nilgiri Hills, gone over and carefully examined the plantations at Dodabetta and Nedivattam and the one near the Pykara river named the Hooker estate. I visited these estates orginally in 1871 and, in company with the late Mr. McIvor and Mr. Broughton, made a prolonged and minute inspection of them. And again in 1878 I made an equally through inspection of them in connection with Commission appointed by Government to enquire into their condition and prospects. During my present inspection I have therefore had the advantage of the knowledge and experience acquired during these earlier visits.

2. Government are familiar, from the reports of the Director, with the composition (as regards the kinds of cinchona grown) of these plantations. It is therefore unnecessary for me to do more than remind you generally that on the four plantations practically only three kinds of cinchona are cultivated. The Dodabetta plantation is essentially one of crown (or *officinalis*) bark, there being more than half a million trees of that sort on it and only about sixty thousand of the sort known as "hybrid"; while there are no trees whatever of the red bark (*cinchona succirubra*). The Nedivattam plantation, on the other hand, consists of about a quart of a million hybrid trees of 89,000 crown barks, and of 25,000 red barks. The Hooker plantations is composed of 373,000 crown barks, 293,000 hybrids and 2,300 red barks; while the Wood plantation consists of about 12,000 hybrids. Distributed over all four estates there are 1,188 trees of various kinds of cinchona which have been raised from seeds from time to time sent out by the India Office for experimental cultivation. These are now cultivated merely as curiosities, as they have all been proved to be without value as sources of quinine on the Nilgiri Hills. I therefore omit them from further consideration. As Government are aware it has from a very early period in the history of the cultivation of the medicinal cinchonas in these hills been known and recognised that the best bark to grow for the manufacture of quinine is the crown or officinalis sort. It has been equally well-known that the red or succirubra bark is one which contains a larger proportion of the inferior alkaloids, cinchonidine and cinchonine; and which, while affording an excellent raw material for the manufacture of cinchona febrifuge, is an inferior raw material for quinine. The sorts known as hybrids are trees which, while inferior as quinine yielders, to the crown barks, are superior to red barks. For various reasons the cultivation of these hybrids was much favoured by the late Mr. McIvor, and it is this fact which accounts for the large proportion of them which still exists on the Government estates. Experience since Mr. McIvor's time has proved that these hybrids are, in the Nilgiris, short lived trees; and that their bark, by reason of the presence in it of so much cinchonidine and cinchonine, is as a raw material for quinine manufacture much inferior to crown bark. The latter is, moreover, also much more hardy than hybrid. The policy of Mr. Lawson has therefore been steadily to reduce the numbers of both hybrids and red barks in the estates, and to replant the areas cleared of these with crown barks. This policy has been carried out to such an extent that at present there are on the four Government estates only about 27,952 red barks and 653,323 hybrids, as against 1,031,005 crown barks. Of this policy I entirely approve, and I would recommend its continuance until the estates contain nothing but crown barks. With the object, however, of keeping up the strain of the latter which appears to have slightly deteriorated of recent years I would support the recommendation made to Government by the Director to the effect that arrangements should be made for the importation from the natural home of the crown bark in the forests of Loxa in the province of Ecuador of a few pounds of good fresh seed of that species.

3. From the preceding remarks it will appear that the Dodabetta plantation is the most valuable of the four and that the Hooker plantation ranks next in value. The Nedivattam plantation has, from the preponderance upon it of hybrid and red barks, a considerably less value at present; but, if the policy be carried out of replacing these by crown barks, it may soon become equally valuable with the two previously mentioned. And at present it is of great importance from the presence on it of the Quinine and Febrifuge Factory. The Wood plantation is, both as regards extent and composition, the least valuable of all four. It consists at present of a small patch (27 acres) of hybrid bark trees; it is inconveniently separated from the other three by the Pykara stream; and in fact the chief argument for its retention appears to be that there is on it a bungalow fit for a European Superintendent to live in, whereas on the Hooker estate there is no such accommodation. The patch of cinchona on the Wood estate is so small, and so exposed to the ravages of game that I would root it up and abandon it. I shall, however, refer to this matter more fully in a subsequent paragraph.

MANAGEMENT AND MODE OF WORKING THE PLANTATIONS.—Up to the dates of my previous visits (1871 and 1878) the only method of taking the bark crop which had received anything like a fair trial was that of stripping and renewal under either moss or grass. Coppicing had hardly been tried. In my memorandum submitted to the Cinchona Committee in 1878 (pages 33 and 35) I recommended that coppicing should be resorted to in conjunction with stripping and mossing. Since Mr. Lawson became Director of the Estates, the system of coppice after stripping and mossing has been regularly followed, and the result has been successful. It has been proved that trees which had been reduced to a weak and unhealthy condition from repeated decortication send up from their stools, when coppiced, healthy and vigorous shoots which in turn yield bark of quite as good quality as the original stems. The scheme of working followed by the present Director has

been to allow the coppice shoots to acquire sufficient size to afford shade to the soil; and, when this has been secured, either to fill up vacancies or to replant entirely with seedling crown barks, removing the coppice when the seedlings have grown large enough to afford shade to each other. This plan is, in my opinion, an excellent one. It is founded on the principle that, in growing cinchonas on these hills, the surface of the soil must be protected both from the direct rays of the sun and from the wash that is the inevitable result of heavy rain fall on bare soil. Another prominent feature in the mode of cultivation which has of late years been followed is the cultivation of weeds and their utilization as green manure. During my visit to these plantations in 1878 I was struck, as was also Dr Bidie, by the absolute freedom from weeds in certain parts of the plantation, and by the consequent denudation of the superficial soil by the wash of heavy showers; and I called attention to the matter in my evidence before the Committee (page 31). The same facts had evidently impressed Mr. Lawson for the soil of the Dodabetta plantation which used to be conspicuously bare is now well covered with a fair crop of surface-rooting weeds. The plantations at Nedivattam and the Hooker estate are all fairly well covered with weeds of a good type, with the exception of a few barren patches which are now under treatment. Mr. Lawson has also carried out extensively the system of digging trenches near the trees which serve as receptacles for any soil which may be washed into them by the rain, also for surface soil which may be scraped into them, and for green weeds which may be buried in them. The results of this system of pitting or trenching appears to have been excellent. The manure of all cattle living in the estates has also for years been carefully conserved and spread on the patches most in want of nutriment. A considerable quantity of bazaar manure has also been carted from Ootacamund for the Dodabetta plantation.

5. Working expenditure on the plantation.—The cost of European establishment is high in proportion to the annual disbursement on cooly labour. This is due to three causes:—

(1) to the fact that the plantations are broken up into so many detached pieces;

(2) to the entertainment of a whole-time officer as Quinologist;

(3) to the fact that the plantation is, from unavoidable causes, worked below its full producing power. The latter cause would be removed by any successful endeavour to increase the demand for quinine and febrifuge. The rapid spread of the sale of quinine in small doses at Post offices and other public offices appears to offer a new outlet for an indefinite amount of the former drug. The cooly labour does not appear to me to be costly and I can suggest no way in which rates might be reduced.

6. Factory.—The factory is organised on the same lines as that of the Bengal Government, the process of extraction of quinine depending on the use of fusel-oil and kerosine. The grinding of the bark is done by a Carter's disintegrater of which the motor power is a vortex turbine which, owing to deficiency of water during the dry season, can be worked only half the year. The disintegrater is, however, capable of grinding 4,000 lb. of bark per day; and, as it can be worked for 150 days in the year, 600,000 pounds of bark can be annually ground, an amount which is more than thrice as great as the vats in the factory are capable of converting into the quinine or febrifuge. The factory buildings are, however, capable of extension whenever more vats are required to meet the demand for their outturn. At present the vats are capable of turning out annually only 4,800 lb. of quinine and about 3,000 of febrifuge—amounts which up to date have exceeded the demand. Should the demand exceed the present grinding power of the disintegrater, arrangements can, the Director assures me, be made for leading water from another stream so as to increase the number of working days and the output of ground bark by one-third. The factory is thus in all its departments capable of expansion. The present accommodation for storage for bark is ample and it also is capable of expansion.

Fuel.—Fuel for the factory is at present obtained from a shola behind the Hooker estate and about two and a half miles distant from the factory. This shola was made over to the Director by a former Conservator of Forests with the distinct intention that it should be worked *coppice fashion* as a source of fuel for the factory. The policy of coppicing standing forest with the object at once of utilizing the timber on it and of providing for its reproduction by coppice is largely followed in France, and it forms the basis of a well-known and highly accredited system of treatment. Of late, however, this policy does not appear to have commended itself to the forest authorities on these hills, and I understand the question is now under consideration whether the above-mentioned shola should not be resumed by the Forest department and the Director compelled to buy fuel for the quinine factory. If this arrangement be carried out, the Forest department propose, as I am informed, to supply *Eucalyptus* fuel at a cost of R6 per thousand pounds, at a spot over ten miles distant from the factory. The rate of carriage to the factory from this spot would, the Director says, be R2 per thousand pounds. The cost of fuel from the present source of supply he estimates as at Re. 1 per thousand pounds. The proposed increase would therefore form a not inconsiderable addition to the net cost of the outturn of the factory. I must say, I think, it would be a mistake to increase the net cost in this adventitious way. The object of the maintenance of the quinine factory is the good of the whole population of the country and the allotment to the factory of a piece of natural forest to be exploited in the interest of the Cinchona rather than of the Forest department does not appear to me to violate any principle of political economy. If the management of the shola in question by the Director were to involve its destruction, there might be a case against its remaining in his hands; but conversion into coppice, not destruction, is the idea of his treatment of it. I would, however, with the view of preventing inconvenience from changes in forest policy in future, strongly recommend that as large an area as possible of the land in the cinchona reserves which is unsuitable for crown barks should be utilized for the production of fuel for the factory. I may mention that, on the Sikkim plantation, there is a large area of forest at the entire disposal of Cinchona department, and that there is besides a fuel plantation which now covers 300 acres, and which is being annually extended during the seasons when plantation work is slack.

8. Grazing.—Attached to each of the plantations there is a certain amount of grass land on which the plantation cattle and also the cattle belonging to the estate coolies are allowed to graze. Such land carries no timber and can be of no use for strictly forest purposes. These cattle are kraaled at night, and their dung is carefully collected as manure which is of great use in the improvement of the poorer parts of the plantation. I think it would be a great mistake to diminish the area of these plantation grazing grounds. If any change is to be made, it should, in my opinion, be in the direction of extension rather than of contraction. I would however strictly prohibit the grazing of cattle in sholas.

9. Ravages of Game.—There is no doubt whatever that young plants and young coppice of crown barks and of crown bark hybrids are much eaten down by sambur and jungle sheep. This is nothing new. The late Mr. McIvor complained bitterly of it to me in 1871 and showed me large areas of young planting which had been practically ruined by the ravages of these animals. I also heard loud complaints about the matter during my visit in 1878. During my present visit I have questioned the Superintendents and some of the natives, resident on the various plantations, and I have seen for myself ample evi-

dences of the evil. In fact any body can see an excellent example of it by examining the margin of the plantation at the distance of a few hundred yards of the Director's bungalow at Nedivattam. And the mischief is even greater on the Wood estate than at Nedivattam. Fencing appears to afford little or no protection against this kind of game, and the only efficient way of protecting the young plantations and coppice is by shooting the deer. For many years there has been on the Cinchona establishment one shikari whose duty it is to frighten the game of the three plantations of Nedivattam, Hooker and Wood. I have read the memorial of the Game Preservation Association and the comments of the Director and of the Collector of the Nilgiris thereon. And much as I sympathise with the objects of the Association, I must say that the grievauces complained of by it are chiefly matters of the past. I fail to see how the proceedings of a single shikari, spread over three such large areas, can be very destructive to game. And I cannot understand how, in the face of the existing evidence, both oral and ocular, it can be contended that game in the neighbourhood of the Cinchona plantations has been virtually exterminated. This is not the opinion of a large cinchona and tea planter in the neighbourhood who assured me the other day that sambur and jungle sheep literally swarm at a distance of 3½s mile from Nedivattam. As the subject, however, appears to have elicited some warmth of feeling, I would suggest that the Wood plantation, where game most abound and where there are only 27 acres of cinchona, should be abandoned ; the cinchona, being first uprooted and its bark taken to the factory. I cannot recommend the dismissal of the shikari, but I would restrict him (as at present) to the actual area of the Government estates.

10. Accounts.—There annually appears in the report of the Director a statement showing the capital and revenue accounts of the plantations from the commencement up to the date of the report. In this return the disbursements of each year are given in one column with interest at 4½ per cent. There are also columns in which the surplus and deficit each year are stated. Up to the end of last year the total deficit is stated to amount to Rs. 641,288-3-6. If the yearly accounts were to be stated like those of a joint stock company this deficit would stand as the capital or as a liability of the company. I cannot, however, understand how the large deficit just named is arrived at. In Captain Campbell Walker's report (p. 16) on the plantation, he gives Rs. 13,04,360 as the Accountant-General's calculation of the total cost of the estates, *plus* annual interest to the end of the official year 1875-76. During the seven succeeding years such large quantities of bark were sold in England that the surplus of receipts over expenditure during these years amounted in round numbers to Rs. 18,39,000 ; in other words the receipts of the plantations at the end of the year 1882-83 had exceeded the total expendture on them from the beginning, *plus* interest, by the sum of R5,34,640. The actual expenditure up to the latter date should, therefore, surely have been considered as wiped out, and the plantations should have been credited with the difference, *i.e.*, with the sum of R5,34,640. From 1882-83 until the present time, the plantation has been worked at an unusual loss. The uet receipts for these twelve years were R6,85,172 and the net expenditure was (exclusive of interest) R9,66,816. If the surplus prior to 1883-84 be added to the receipts since that date, the amount comes to more than 12 lakhs of rupees, as against less than 10 lakhs of expenditure. If 2 lakhs be allowed for interest (a sum which surely must be considered as ample) the capital cost of the estates has really been extinguished, and no annual charge for interest is really admissible. It is utterly disheartening for any man to have to work under a financial disability (eveu although it be only imaginary) such as the Director of these plantations has hitherto done. I venture therefore to recommend that, from 1st April 1895, a new departure should be taken in the accounts ; that the charge for interest should disappear, and that a stock account, debit and credit cash account and balance sheet should be annually given. In this way the exact results of the year's working would be shown within the compass of a single page.

11. The Resources of the Plantation.—I need hardly remind you that since the suspension during the official year 1883-84 of the practice of selling the bark produced on the estates, these plantations have not been worked up to their full producing power. They have in fact been very lightly cropped ; and, even since the manufacture of quinine was begun, the demand for that drug has never yet been equal to anything like the producing power of the plantation. The natural increment of the bark of many trees therefore remains on the trees as an undrawn dividend. The result of this light croppng and of the judicious method of cultivation, and of collecting the bark which have been followed during the past 12 years, is that the plantations are now in a much better condition than they were when I went over them in 1878. An examination of some of the figures given in the Director's report for the official year which ended on 31st March last gives an idea of the present actual condition of the plantation. I find that, during the year 1894-95, 6,720 crown bark trees were coppiced on Dodabetta and the yield of dry bark from them was 51,522 lb. On Nedivattam 4,713 trees were coppiced with a yield of 17,081 lb. ; and on, Hooker estate, the 6,949 trees which were coppiced yielded 27,008 lb. of dry bark. This is at the average rate of about 5 1-5th lb per tree. The Director assures me that the trees for coppicing were not selected because of their size. On the contrary, they were selected as trees which had, from repeated stripping and mossing, begun to show signs of weak health, and they were coppiced in order that they might have an opportunity of springing afresh from their cut stumps. In the language of French forestry the trees were coppiced as part of a *coup de regeneration*. Trees to the number of 18,382, cut as a measure of arboricultural improvement (and which, owing to their sickly state, yielded bark of poor quality from which not more than 3 per cent. of quinine may be expected) thus yielded 95,611 lb. of dry crown bark. After deducting these trees, there remained of crown barks on the Government plantations (according to the returns) more than a million trees, some in excellent and the others for the most part in fair health. If the proportion of the bark on the trees that remain be in proportion to that of those which were coppiced last year, the crown bark trees on the three Government estates carry a grand total of 6 million pounds of dry bark. These results which have so surprised me that I have had all the calculation checked are seen at a glance in the following table:—

		Trees up-rooted during 1894-95.	Bark yielded.	Trees left at 1st April 1895.	Bark left at 1st April 1895.
Dodabetta	..	6,720	51,522	568,295	4,357,090
Nedivattam	..	4,713	17.081	89,666	324,970
Hooker	..	6,949	27.008	373,044	1,449,064
Total	..	18,382	95,611	1,031,005	6,131,124

From the foregoing calculation I have entirely ommitted the 663,328 hybrid trees which, according to the Director's returns, existed on the four plantations at 1st April last. If the bark on these be calculated as equal, when coppiced to four pounds per tree, there is an addition to the resources of the plantation of about 2½ million pounds of bark. The total amount of bark which the plantation would yield, if coppiced at once, is, according to these estimates, therefore over 8½ million pounds.

It is probable, however, that calculation founded on the number of trees may be fallacious ; for the numbers are continually being altered by death and accident ; and it is impossible, short of an annual census (which would cut more than it would be worth) to esti-

mate accurately the number of trees that actually exist. It may be advisable therefore to cut down these figures by half and to reckon 4¼ million instead of 8½ million pounds of dry bark as the quantity that would be obtained were the whole plantation coppiced now. On the other hand it must be recollected that the trees, if worked on a rotation of twenty years, would yield during that period repeated crops of bark by the stripping and mossing process prior to their finally being coppiced. As a check on these calculations based *on the number of the trees* on the plantation, I shall now give a calculation based on the yield per acre. Captain Campbell Walker's survey showed the actual area to be 848·74 acres. Since the date of his report the Wood estate has been reduced from 72 acres to 27, being a diminution of 45 acres. The acreage of the other estates remains exactly the same, and the whole area now under Cinchona may be therefore taken roughly at 800 acres. Statistics show that the average yield on Dodabetta of an acre, when coppiced, is about 4,000 lb. (excluding root bark) and that the amount of bark yielded by the same acre by stripping and grassing subsequently to 1880 and prior to coppicing appears, from the few areas of which an accurate record has been kept, to be about 1,450 lb. The total yield of the whole plantation, if coppiced at once, would therefore according to these figures be 800 by 4,000 equal to 3,200,000 lb. of dry bark. And the amount obtainable by stripping over a period of twenty years would, at 1,450lb. per acre, stand thus:—800 × 1,450=1,160,000 pounds of dry bark.

The actual stock of bark of all kinds in the plantation thus comes out as 4,360,000 lb.

13. Annual Outturn of Bark and Quinine.—The calculation per acre appears to me to afford a safer basis for estimating the amount of bark which can annually be taken as the normal crop; in other words of estimating the amount of dividend which may be drawn from the estate without encroaching on the capital. The oldest trees on the plantation are now about thirty-three years of age, and experiments in coppicing show that good returns in the way of crop can be obtained from coppice shoots from twelve to fifteen years old. The Director is of opinion, and in this I agree, that twenty years may safely be taken as the rotation on which the plantation may be worked. On this basis, the annual crop would, therefore, be 218,000 lb. from which there could be extracted (at 3½ per cent.) 7,630 lb. of quinine. But the bark contains a certain percentage of Cinchonidine, Cinchonine and Amorphous quinine; there would, in addition, therefore be a considerable quantity of Cinchona febrifuge.

Suggestions for Future Management.—In view of the early retirement of Mr. Lawson, the question of future management is a pressing one. There are, it appears to me, two arrangements which might be made, and these are *first* to find a successor for Mr. Lawson, who will perform exactly the same duties as he does; *second* to dissociate the appointment of Government Botanist from that of Superintendent of the cinchona plantations and factory. The second is the arrangement favoured by Mr. Lawson, who has addressed Government on the subject. Mr. Lawson's proposal is that a skilled Botanist should be got out from England who should have his headquarters in Madras (where the Government Herbarium should be located) and who should fulfil the functions of Government Botanist and of referee and adviser to Government on all matters connected with scientific horticulture; who should lecture on Botany in the Madras Colleges and act as Examiner in Botany in the University; and part of whose recognised duty it should be to carry out the botanical exploration of the Presidency—many parts of which towards the west and south are still, from a scientific point of view, very imperfectly known. In my own opinion, this proposal is probably the better of the two, but it is the more costly. Against the first scheme there is this to be said: that it will not be easy to get a man of Mr. Lawson's calibre and previous experience to accept the appointment on the scale of pay at present sanctioned for him. It is in fact extremely improbable that a gentleman who had been a professor of Botany in a great English University, and who has had many years experience of the management of a Botanic garden (Mr. Lawson held charge of the Oxford garden for fourteen years) would be secured by the Secretary of State as Mr. Lawson's successor. Against the second scheme the chief objection is its cost. A Government Botanist, with functions as above described, could not, I fear, be obtained even on the salary now paid to Mr. Lawson; far less on the salary (R400 rising to R600 per mensem) suggested by Mr. Lawson. The superintendence of the Cinchona plantations has, moreover, to be provided for. This would have to be considered by Government in connection with the arrangement by which a whole-time officer is entertained as Quinologist; and that is not one of the matters referred to in the Government Order under which I submit the present report. The qualifications of the officer who may be selected to succeed Mr. Lawson in charge of the plantations and factory should, in my opinion, be as follows: he should be an educated man with a sufficient knowledge of agriculture and horticulture, both theorotical and practical, so as to put him on a higher level, in this respect, than any of his subordinates. It might, and I dare say, would be impossible to get a man with a special knowledge of cinchona cultivation; but a man who has general horticultural knowledge and experience would, if he had the advantage of a little tuition under Mr. Lawson, soon pick up the peculiarities of the culture in cinchona. I consider a knowledge of this sort as more necessary for the new Superintendent than a knowledge of Chemistry. For the plantation has now passed beyond the stage when the continued guidance of a quinological expert is necessary. Most of the chemical problems which are likely hencefor- ward to present themselves ought, if not at once certainly after a few months experience, to be capable of solution by an ordinary chemical expert in Madras or elsewhere. I do not mean in the least to decry chemical knowledge, which no doubt will be of great use in working the factory. All I mean to say is that for the management of the plantation (in its present condition and of the factory, *as a joint charge*, a knowledge of horticulture is of more importance than a knowledge of Chemistry. One qualification which the Superintendent of these plantations should most certainly possess is a capacity for estate management and for the organization and control of labour. A most important point for the future management of these plantations will be to secure a continuity of policy. This can never be done if the management be sometimes vested in hands of an officer of one department and sometimes in the hands of another department—neither being experts. The best thing to do would be to secure a man of capacity, energy and tact, and to make it worth his while to remain on in the appointment long enough to accumulate special experience and knowledge, and to utilize that knowledge and experience in the interests of Government. These estatas are, in my opinion, a valuable property. The present Director has made it his policy to conserve and to nurse them, and to bring them into a condition under which they can be worked on a definite system. He has succeeded, it appears to me, in putting the Dodabetta plantation into such a condition. Much progress towards this end has been made on the Hooker estate. But the Nedivattam plantation, from having been originally planted out without proper regard to the separation of varieties, is still in a backward condition. The new Superintendent should, in my opinion, carry out Mr. Lawson's policy. Anything like the reversal of policy and general *bouleversment* of current arrangements which so often characterises a change of management is much to be deprecated for these estates. For their future value and their continuity as a source of bark will depend greatly on the way in which they are worked during the next few years. If judiciously treated they may at once be counted upon for the annual supply of 7,630 lb. of sulphate of quinine besides a large quantity of cinchona febrifuge as a by-product. In making the estimates of the resources

and normal outturn of the plantation which are given in paragraphs 10 and 11 of this report, I have intentionally taken the lowest figures. I would, however, have no hesitation in taking a larger annual crop than 218,000 lb. of bark should it be necessary to do so in order to meet a demand. And, if the growth and health of the trees continues as good as at present, I see no reason why, in a year or two, 300,000 lb. of dry bark might not be taken as the normal annual yield.

In my own opinion the consumption of quinine in India is bound to increase rapidly; and not many years will, in my opinion, elapse before the resources of the Nilgiri plantation will (as those of the Sikkim plantation are now) strained to the utmost to meet the demand. The object which the Secretary of State declared to be that with which Government introduced the cultivation of chinchona into India was "to put the only efficient remedy for the commonest and most fatal of Indian diseases within the reach of the poorest;" and that object appears to be in the point of being realized.

INDIA AND CEYLON TEA IN AMERICA.

In the New York *American Grocer*, the leading trade journal of that great country, are now appearing weekly a series of most taking advertisements, evidently the sensible idea of the above gentlemen [Messrs. Blechynden and Mackenzie]. The advertisement is a full page one, facing the leading article, well executed cuts from photos give views of the various stages of tea, from growth to manufacture, and underneath is the following letter press showing a convincing contrast between the two articles now offered for American consumption.

INDIAN AND CEYLON TEAS.

The Cultivation and Manufacture of these Teas explains their extraordinary quality.

MARK THE CONTRAST:

INDIAN AND CEYLON.

LANDS.—New and Fertile.

GARDENS.—Large, well planted, central modern factories, daily manufacture of leaf.

MANUFACTURE.—Modern, up-to date, especially devised machines for twisting and drying leaf, *untouched by hand.*

PURITY.—Full standard; never rejected from any port.

CHINA AND JAPAN.

LANDS.—Exhausted centuries ago, fed with poisonous fertilisers.

GARDENS—Small, scattered; leaf kept in family dwelling houses, with pigs and poultry till marketed.

MANUFACTURE.—Ancient; barbarous; leaf twisted by the hands of semi-nude moist Mongolians, amidst the sordid surroundings of a Chinese dwelling. No factory inspection and much *Sweating.*

IMPURITY.—Adulterated, colored, faced, "Lie Tea." Rejected on these grounds daily. A shipment recently rejected at New York was admitted through a Western Port of Entry. See daily papers, Importer's Confessions in Petition to Congress.

RESULT :—

	1894.	1895.
	Imports.	
	lb.	lb.
Increased Consumption;	5,379,542	9,283,141

The following statistics culled from the same source show the growth in the import of tea from 1880 to the current year inclusive.

IMPORTS OF TEA.

Year. ending 30th June—	Net Imports. Pounds.	Value. Dollars.	Av. Import price per lb. —Cents.	Per capita population. Pounds
1880	69,894,769	18,983,368	27·4	1·39
1881	79,130,849	20,225,418	25·7	1·45
1882	77,191,060	18,975,046	24·6	1·47
1883	69,597,945	16,278,891	23·5	1·30
1884	60,061,944	12,313,200	20·2	1·09
1885	66,374,365	13.135,782	19·5	1·18
1886	78,873,151	15,485,265	19·6	1·37
1887	87,481,186	16,365,633	18·7	1·49
1888	83,914,547	13,154,171	15·8	1·40
1889	79,192,253	12,561,812	16·0	1·28
1890	83,494,956	12,219,643	15-0	1·33
1891	82,395,924	13,639,785	17·0	1·29
1892	81,610,741	14,267,411	16.0	1·37
1893	88,131,088	13,651,800	16·0	1·32
1894	91,801,565	13,857,893	15·1	1·34
1895	96,437,042	13,029,868	13·5	1·37
1896	93,300,218	12,585,741	13·5	1·33

—*Indian Planters' Gazette*, Sept. 26.

TEA IN AMERICA.

New York, Sept. 9.

The dull business was made more pronounced by two and a half holidays. The market drags except on choice Formosa Oolong. Old crop in buyer's favor. No change in other sorts. The auction this week includes some new crop Moyune and Congou, and is awaited with interest. Today at noon the Montgomery Auction and Commission Company will sell 5,535 packages, viz: 354 half-chests Moyune, all new season; 288 half-chests and boxes Pingsuey; 899 half-chests Congou, including seasons 1896-97; 131 packages India, Java and Ceylon; 716 half-chests and boxes Amoy, a desirable assortment; 1,111 half-chests Foochow, and attractive offering, including the "Kum Wo" chop; 2,036 half-chests and boxes Formosa, all new crop, and including an attractive invoice of true summer character.—*American Grocer.*

THE FLUSH-WORM IN CEYLON.—*Planting Opinion*, of Sept. 26, says:—Ceylon planters, ever mindful of the awful ruin that swept out their coffee-plantations, are keenly on the watch to detect any similar fungoid or insect pests on their tea. Hitherto, beyond a slight attack of elopeltis or mosquito-blight, we believe Island tea has kept remarkably free from all blights and diseases that are such serious factors in Indian gardens. But to come to the point, we noticed some weeks ago in a Ceylon exchange, the *Observer*, an enquiry as to the nature of a certain caterpillar that rolled itself up in tender flush. This query having been reproduced in the *Tropical Agriculturist*, we think it worth pointing out that this caterpillar is very probably what is known on the Nilgiris as flush-worm. Ceylon tea-planters would do well to keep this insect severely in check by specially picking and burning or otherwise destroying the affected leaf, as on the Nilgiris this pest is the direct cause of by no means inconsiderable loss of flush. A common method on some estates is simply to instruct the pickers to crush the rolled up leaves in their fingers, but as this is slurred over in nine cases out of ten, the remedy is obviously a very incomplete one. Merely picking the leaf and dropping it on the ground is of little use, as the caterpillar will usually manage to secure a fresh habitat.

COCONUT PLANTING IN BRITISH CENTRAL AFRICA.

In Ceylon Europeans are more and more engaging in Coconut planting at the lower elevations and the question arises, can we here not do something in the same line! By "here" we do not refer to Nyasaland but to the Zambesi and lower Shire districts, for although the *Gazette* may prove that coconuts grow at Jumbe's on Lake Nyasa, we are afraid, it would find it very difficult to persuade planters that they can be grown lucratively there, or anywhere else, in the interior. It may be objected that the only other place is the Portuguese littoral and it is to it we refer. We are aware that this is a formidable objection owing to the well-known "dog in the manger" policy of the usual Portuguese authorites, but we ask if it would not be possible, with the help of our government, to get such concessions or make such contracts would leave absolutely no room for abuses. Were such the case we believe coconut plantations would be as successful on the East Coast as they are in Ceylon and other countries and as the market for copra and coir is a good one there is every inducement for capital to see what can be done in the way of adding to the producing capacity of East Africa. The chief commercial products from the coconut are its oil, yielded by the kernal which when broken up into small pieces and dried is called *copra*, and its fibre. The fibre is usually divided into two classes—"bristle" and "mat" fibre"—the former being worth from £30 per ton and the latter about £20 per ton. A third class of fibre, composed of the refuse, is worth about £10 per ton. Nuts are sometimes got about the fifth year but full bearing does not commence till the seventh to the twelfth year and the yield, under favourable circumstances, continues increasing up to the twentieth year. The residual matter, after the oil has been expressed from the kernal called poonac, is well esteemed as a manure for coffee and would probably find a ready market in B. C. A.—*Central African Planter* for Aug.

INDIAN TEA ASSOCIATION.

CALCUTTA, Sept. 2.

Proceedings of a Meeting of the General Committee held on the 2nd Sept:— * * *

A letter dated 27th July was read from the Honorary Secretary, Central Travancore Planters' Association, remitting R1,413-14 6 as a contribution to the American Market Fund. Mr. Acworth mentioned in this letter that every tea estate in the district has contributed. An acknowledgment had been sent conveying the Committee's best thanks for the hearty support still continued to be given by the Central Travancore Planters' Association to the efforts for the extension of the Indian tea trade in America.

Letters of 17th and 24th July and 7th August from the Secretary, India Tea Association, London, also in connection with the American Market Fund, which had been previously circulated, were now brought up for consideration. The Committee noted that Sir Henry Truman Wood had at length received the medals and diplomas of the various tea companies and estates represented at the Chicago Exhibition, which had been distributed to all the companies having offices in London the remainder having been sent by the India Office to Calcutta. In response to a request from the London Committee, a sum of £1,000 had been remitted on the 1st instant. The total amount of contributions paid and promised up to date was reported as R99,288-10 0, and the balance in the Bank of Bengal after making the above remittance was R45,886-15 1, the outstandings being in process of collection. * * *

The Committee next proceeded to consider a memorandum prepared by the Secretary, Bengal Chamber of Commerce, with reference to a proposal recently made in the House of Commons for the abolition of duty on British-grown tea, the discussion on which had been postponed at the last Meeting. It was decided that very little could be done on this side beyond supporting any efforts which might be made by the Committee of the Association in London and supplying them with all necessary information. Copies of the memorandum were to be sent home and the attention of the London Committee strongly drawn to the matter urging them to keep the agitation on the subject alive.

The next matter for consideration was a letter, dated 11th August, from Brigade-Surgeon-Lieutenant Colonel W. A. Crawford Ro-, Honorary Secretary, Pasteur Institute of India, Simla, forwarding proceedings of a meeting held at Simla on the 10th August, to decide the question of the establishment in India of a Pasteur Institute, for the investigation and combatting of infectious diseases affecting the population of India and for the solution of economic problems.

Also letter of 24th August from Surgeon-Lieutenant Colonel G. S. Ranking, M.D., Honorary Secretary, Bengal Branch, Pasteur Institute of India, asking for an early consideration of the former letter and expressing the hope that substantial aid would be afforded by the mercantile community towards the foundation and maintenance of the Institute. Dr. Ranking asked for a donation of R20,000 and an annual subsidy of R15,000. The Committee gathered that the fixing of the site in Bengal, in favour of which they had recorded a resolution at their last meeting, was more or less dependent on the amount of local support received.

After giving the papers before them due consideration, the General Committee decided to contribute a donation of R5,000 from the funds of the Association towards the establishment of the Institute on the understanding that it was to be located in Bengal and have the support of Government.

As the establishment of the Institute commended itself to the Committee as being an object meriting support from the Mercantile Community, the majority of whom were more or less interested in the welfare of labour directly or indirectly in connection with tea gardens, coal mines, or jute mills, it was decided to ask the Committee of the Bengal Chamber of Commerce to circulate a subscription list amongst its members which would cover the whole of the ground, and which the Committee felt would be a better plan than for the various Associations to solicit subscriptions each from its own members as in the latter case, firms would in many cases be asked to subscribe three times over.

With regard to the request for an annual subsidy of R15,000 made by the Honorary Secretary, Bengal Branch of the Institute, the Committee felt that no guarantee whatever could be given as to this by the Indian Tea Association as such. If the Institute proved itself of real value, it would no doubt receive support and a suggestion was made that a considerable annual sum might reasonably be expected from the tea industry by the fixing of a small fee on each coolie inoculated. This fee might yield an income of R10,000 on the supposition that one-third of the number of coolies proceeding to the tea districts were inoculated.

* * *

Read letter No. 3,719 of 11th August from the Officiating Director of Land Records and Agriculture, Assam, enquiring if any explanation could be given with regard to the fall in the average prices of Assam and Surma Valley teas during 1895-96, as against the average prices in 1894-95. This letter had been replied to, stating that the crop of 1894 was a fine one as regards quality, while that of 1895 was not so, the weather not being seasonable, and this naturally had an unfavourable effect upon prices.

* * *

The Secretary of the Association in London having stated that it would be worth while to send home

a monthly telegram advising the state of the weather and the prospect of the crops in the principal tea districts, it was decided to arrange a telegraph code for the purpose of reports on the different crops in the following districts :—Assam, Cachar, Sylhet, Dooars, Terai and Darjeeling. The Assam Branch were making arrangements with their district Committees to supply the information direct to the Association in Calcutta, and telegrams were being received regularly from the Honorary Secretary, Cachar Branch. It was decided to communicate with the Darjeeling and Dooars Sub-Committee with a view to obtaining regular telegrams from the Dooars, Terai and Darjeeling districts.

Considered letters of 20th and 31st August and 2nd September from Messrs. Williamson, Magor and Co., stating that their attention had lately been drawn to several cases in which chests had been found on inspection at the London Warehouse to be as much as from 18 to 24lb. short of the invoice weight, and giving particulars of the shipments. They feared that the thefts of tea which had been stopped by the vigilance of the Police last year were commencing and suggested that the attention of the Commissioner of Police should be called to the matter. It was decided that the information furnished by Messrs. Williamson, Magor and Co. should be communicated to Sir John Lambert with a request that the same vigilance on the part of the Police which had such good results last year should be maintained during the present season.

The Committee had before them extracts from the *Planter* on the subject of slack packing of tea at gardens, both of which contained many useful hints. The remarks on the economic side of the question of slack packing, they considered, were deserving of attention, as slack packing necessitated 11 to 12 per cent. more packages than were actually required, meaning a considerable extra expenditure on the garden.

Considered letter of 13th August from Messrs. Duncan Brothers & Co, giving extracts from a letter addressed to them by an experienced Assam planter as to the manner in which tea chests were stowed and handled on board the River Steamers, which he considered had much to do with the damage now being complained of. A further letter of 28th August had also been received from Messrs. Balmer, Lawrie & Co., with reference to tea chests which have arrived in a disgracefully damaged state from Dibrugarh *via* Goalundo. In this case the boxes were all made of good half inch wood and could only have been damaged by rough usage, and Messrs. Balmer, Lawrie & Co. were of opinion that it was the result of the boxes being thrown into the hold in the course of shipment. It was decided to follow up the letters already written to the Assam and Cachar Branches on the subject of damage to tea in transit by placing before them the substance of the letters now received, and it was also agreed to address the River Steamer Companies with reference to the matter, as proof had been now obtained that a certain amount of damage accrued to tea on board the River Steamers.

Considered letter No. 1116-96 of 5th August from the Secretary, Bengal Chamber of commerce, asking to be furnished with a copy of the report of the Subcommittee on the handling of packages of tea in the Port commissioners, Warehouse and Jetties which had been done in due course, and also further letter No. 1237-69 of 1st September, thanking the committee for the information given, and asking if the committee of the chamber could be kept informed from time to time as to any action taken by the general committee in connection with the handling or shipment of tea. This was agreed to.

Considered file of replies received to the Committee's Circular No. 335 O of 14 August with reference to a suggestion made that shippers of tea should issue a circular to the Liners, stating that they authorise and direct steamer officers to refuse any and every chest they were not perfectly satisfied with, and that they would guarantee that no line would suffer or lose shipment of tea owing to the strictness of its officers. The general concensus of replies received was against the adoption of the suggestion, various objections being raised to it and the Committee had consequently no alternative but to allow the matter to drop.

Exports of Indian Tea from Calcutta.

	1896. lb.	1895. lb.	1894. lb.
Clearance to Great Britain in Aug ..	18,991,425	15,033,258	17,808,631
Clearances to Great Britain from 1st April to 31st Aug.	42,969,248	41,176,840	39,820,750
Clearances to Australia and New Zealand in Aug.	769,895	765,598	612,180
Clearances to Australia and New Zealand from 1st April to 31 Aug.	1,736,810	2,479,121	1931,433
Clearances to America in August..	*178,734	194,761	53,817
Clearances to America from 1st April to 31st August..	322,471	281,426	111,847
Clearances to other places in Aug..	898,103	751,969	607,114
Clearances to other places from 1st April to 31st Aug..	1,640,312	1,570,061	1,240,003
Total Clearances from 1st April to 31st August.. ..	46,668,871	45,507,448	43,104,033

Actual shipments to Great Britain from 1st April to 31st Aug. 1896 .. 45,817,468 lb.
Actual shipments to Great Britain from 1st April to 31st Aug. 1895 .. 45,643,011 lb.

Exports of Tea from Ceylon.

Total Exports from 1st January to 18th August 1896 ..	.. 70,284,878 lb.
Total Exports from 1st January to 18th August 1895 ..	.. 65,630,006 lb.
Total Exports from 1st January to 18th August 1894 ..	.. 57,437,427 lb.
Total Exports from 1st January to 18th August 1893 ..	.. 53,921,473 lb.
* Exports to United States ..	... 126,559 lb.
,, to Canada ..	.. 52,175 lb.

—*Indian Planters' Gazette.*

HOPE FOR THE CHINA TEA TRADE.

In another column will be found a letter and an article reproduced from the *Foochow Echo* in which an important announcement is made, namely, that foreign machinery and foreign methods have at length been introduced in the preparation of tea in one of the districts near Foochow. The commencement is a small one and how the experiment will result remains to be seen. The machinery has been got up to Peeling without opposition, but whether immunity from mandarin obstruction will continue to be enjoyed is doubtful. There can be no doubt, however, that if the adoption of foreign methods were officially approved they would speedily become general and a great revival in the tea trade would result, notwithstanding the heavy taxation to which the article is subjected, amounting in all, it is said, to 40 per cent. If at the same time that foreign methods are introduced the taxation were either wholly abolished or reduced to a moderate amount the China tea trade would soon regain its ancient glory and wealth would once more flow into the districts that have become impoverished by the loss of their principal industry. If foreign capital were allowed to be freely invested in the interior we would soon have numerous planting companies established whose prospects would be even brighter than that of the Shanghai cotton companies from which so much is expected. Following its usual policy, however, China would probably object to foreigners acquiring any vested interest beyond the treaty ports. In the case of the Foochow enter-

prise Mr. Fraser has presumably been enabled to make some special arrangement to permit of his establishing himself at Peeling, but on this point the local paper is silent. In any case, however, the introduction of foreign machinery and foreign methods affords a ray of hope brighter than any that merchants interested in the China tea trade have enjoyed for many years.

IMPROVEMENT OF TEA MAKING AT FOOCHOW: INTRODUCTION OF THE INDIAN METHOD.

The following letter appears in the *Foochow Echo* of the 12th September:—

Dear Sir,—It has been a subject of remark during the past few weeks that you have maintained a mysterious silence regarding the crisis, if I may so call it, that has come about in the Foochow tea trade. The purport of this letter is quite as much to induce you to break that silence and if possible to draw forth some opinion from you as to our prospects, as to furnish you readers with the news, which cannot fail to be of interest to all.

Mr. Fraser, of the firm of Fraser, Ramsay & Co., after visiting the tea gardens of India and Ceylon and making himself acquainted with the methods adopted in those countries of picking and curing tea, has managed to introduce them into one of the tea districts here and with such marked success that a prosperous future for the Foochow tea trade seems assured. So far, what has been done is merely an experiment, but the most satisfactory results have been obtained, that is to say, teas of the prettiest make and appearance have been produced, drawing a strong dark liquor, with an infused leaf of the approved bright golden colour. What more is required? We are at once placed in a position to complete with Indian and Ceylon growers in the great consuming markets of Great Britain and Australia.

No difficulty was found in starting a company locally for the purchase of machinery and for otherwise pushing the adoption of the new method of making tea among the Chinese. The name of the Company is the "Foochow Tea Improvement Company."

Over and above this, I hear that there is quite a little undercurrent of excitement going on in the foreign hongs. Of course with such a conservative people as the Chinese it is unlikely that more than a small proportion of the Congou crop will be made in the new fashion for a year or two, but in the meantime it is understood that some of the foreign hongs are already vieing with one another to get this small proportion into their own clutches. All sorts of inducements are being offered, which the Canton and Chin-chew hong-men will not relish. Liberal advances are to be made to intending operators in this few fashioned tea, and extensive godown-room is to be placed at their disposal. The novel (to Foochow) method of selling the tea by auction has been proposed—the advancing Foreign Hong to be the auctioneers, who further proffer their services to ship any teas, for which satisfactory prices are not bid, to the consuming markets of the world on owners' account. There is nothing like taking time by the forelock.

Pray, Mr. Editor, let us have your views, or those of any of your contributors who may care to favour us with theirs.—I am, dear sir, yours truly, T.

Upon this the *Echo* makes the following comments:—

We find ourselves forestalled by our correspodent "T" in being the first to make public an important piece of news, the introduction into this province of the Indian method of making tea. We were asked by some of our subscribers not to publish anything we might hear about it for a time, and it is only within the last few days that we have been released from our undertaking to abide by the request. Although the thought may have been quite original on Mr. Fraser's part, it was not altogether a new one. The idea of its feasibility had occurred to more than one of our resident merchants, but was abandoned by reason of the difficulties attending the introduction appearing to them insurmountable. It may be guessed that the foremost difficulty was the certain strong opposition of the Chinese, high and low. It was reserved for Mr. Fraser to do what others had feared to attempt, and if all goes well, as the result of his first experiment seems to predict, his name will be handed down to posterity as the reviver of our moribound tea trade. Mr. Fraser followed up the conception of the idea by going to the gardens and factories of India and Ceylon and learning for himself all that he could about tea cultivation and tea curing in these countries. On his return to China he brought with him a tea rolling machine, which was no doubt to be followed by other machinery necessary to complete the curing on Indian principles. The rolling machine was landed, but now came the question of the difficulties which dreamers of the scheme had looked upon as insurmountable, Mr. Fraser reckoned up and circumvented them. He had his establishment at Peeling and managed to get all his machinery up to that district, piecemeal, without ruffling either the tender susceptibilities of the sleepy officials or the local population. Instead of hiring a score or two of Foochow coolies rush the machinery up *en bloc*, which would have created suspicion, ill feeling, and possibly trouble, he had it carried up at intervals, bit by bit, by local coolies sent down from Peeling for the purpose, and they arrived with their burdens without attracting any special attention. Thus this formidable difficulty, as it was considered, was overcome by a little fact and good management. It was promptly set up and brought into play with the satisfactory results mentioned by "T," namely, in pretty dry leaf, nice strong and dark liquoring waters (so much liked by the English masses), and infusions of the approved bright bronze coloured infusions being produced. But before describing the result we ought first to have mentioned that the Chinese mode of picking of, withering, and fermenting had all to be altered. This was quickly taught, and it is said by the Chinese that these preliminary processes apart from the use of the rolling machinery, are sufficient to produce the made tea with all the characteristics of that shipped from India and Ceylon. Experts who have seen these teas declare them to be wonderfully good but Mr. Eraser and his friends, believing that machine made teas will be far superior, have formed themselves into a company, and several influential merchants have joined them, for the purpose of importing all the machinery necessary. We wish the company all possible success.

The Foochow tea trade continues to decline so rapidly, excepting for its specialities, that all interested in the port at all must welcome warmly any move that is likely to revive it, and should give all the encouragement they can to Mr. Fraser and his friends, in the expense and trouble they are going to, to keep the trade alive.

Having furnished our readers with a brief sketch of what is going on in this new departure in the history of the China tea trade, we willingly comply with our correspondent 'T's" wish that we should give our views on the subject. We have to say that we are only deterred from boldly asserting that Foochow has a future before it by the thought of the cruelly heavy export duty, likin, and other taxes we have to submit to, which together amount to fully 40 per cent, on the average cost of the season's crop. Given that we are successful in making teas that will be as readily saleable as those of India and Ceylon in the great consuming markets, how, can we look for a prosperous trade with such a handicap as this 40 per cent to add on to our first cost?—*Hongkong Weekly Press*, Sept. 18.

IMPROVEMENTS IN THE FOOCHOW TEA TRADE.

Our most important news is that an experiment has been made in making Foochow tea on Indian methods and that it has proved successful. If this can be carried out on an extensive scale it will be a great thing for Foochow. Our teas as at present made become each year more difficult of sale in London and Australia. The trial was initiated by Mr. Fraser, of the firm of Fraser, Ramsay & Co., and on its

being found to be successful a company was formed for the purpose of procuring machinery and otherwise bringing about the change as quickly as possible. I have not heard of any trouble having been met with at Pacling where the first machine was set up, and it is to be hoped that none will be encountered when other machines are taken to other districts in the early spring. We have always been led to believe that anything in the way of machinery which is supposed to lessen the demand for labour would lead to rioting, but we may have been gulled. We must hope for the best, many of the Chinese amongst us have entered into it warmly, but I must add, on the other hand, that many stand aloof. The new-make will, no doubt, cost more, but then it will sell at a higher price. Anyhow, from the outset we shall have teas that are saleable, which is not the case with us at present. If the cost is too high at the beginning, that is a matter that will right itself later on. The terribly heavy duties and likin we have to pay alone stand in the way of a sanguine view being taken of the future of the trade, for there is no doubt about the determination of the enterprising company to make the thing a success.—*N.-C. Herald*, Sept. 18.

NYASSALAND NOTES.

Rumour has it that the Ceylon planters have got terribly afraid of this country owing to reports of our climate being so fearfully bad as to be called by some deadly to the poor martyrs white men, whose misfortune compels them to live here.

I see by a late *Observer* that some Nyassaland correspondent asserts that Mr. Owen who was sent over here by Mr. Carson nearly died from blackwater fever ; also that the late A. T. Miller died from the same complaint. Now I am in a position to contradict this statement as untrue, Mr. Owen had fever certainly off and on during his short stay here ; no doubt the malaria he absorbed on his journey up the Shiré came out when the hills were reached, as it does on nearly everybody who comes here, so he finished it and cleared. Regarding Mr. Miller's death, I assure you he died from an internal complaint and had no fever during his 6 months in Nyassaland. Fever is common enough here I don't pretend to deny, but it is mostly brought on by men's own fault. Except the introductionary fever dose, which few escape and as few if any die : from it is easier cured, of a much milder type and not nearly so obstinate and dangerous as Ceylon lowcountry fever : in fact it is thought so little of by old residents that they don't seem to mind it in the least ; and for my own part I would rather have 24 hours Nyassaland fever than a severe cold, which I have by the way at present, and it has stuck to me for 10 days and I can't shake it off. If our country was so deadly as represented, why have we so many ladies amongst us? One gentleman replied to me : "Oh ! they never get ill." I can count 18 to 20 of the fair sex in the country, and never heard of any of them being seriously ill : those I have seen looked well, and two or three after 7 or 8 years' residence look blooming and much improved by these residence in B.C.A.

There is, however, a form of fever more unknown in Ceylon, and by the way unknown here until about 4 years ago, viz. blackwater, which has proved fatal in many cases, mostly for want of proper nursing and knowledge of how the disease should be treated. I have seen several cases and have had the complaint twice myself, and if properly treated is not in my opinion so serious as people would like to make out. It is as well, we are thankful that this form of fever is not very common and has, as far as my knowledge goes, only been contracted by those engaged in opening up Coffee estates, and living in or visiting unhealthy parts of the country Upon the whole the country cannot be called healthy for Europeans any more than many of the districts in Ceylon were, before they were opened up, and during the opening of large tracts of country for tea and coffee. I would rather have ten doses of Nyassaland fever than one Kurunegala attack, and I have experienced both. My advice to Ceylon men is not to come here if they are afraid of a dose of malarial fever or what is commonly called here a "belious attack" as common in the Ceylon mountain zone as here. This year has proved a very unhealthy one for both Europeans and natives ; it has been worse than I have known it for several years back, and has proved fatal to a few as you would see by the sad deaths of the brothers Buchanan whose loss is much felt and greatly bemoaned by all.

The Nyassaland Co.'s Superintendent is not going to lose time this year, for he has already knocked down nearly 200 acres, and has over 300 labourers at work ; so who can say labour is scarer here ? Distant reserves of labour have hardly been tapped yet, but facilities are now offered for getting labour from a distance which did not exist a year or two ago : for instance the Agent of the B.C.A.A. stationed in Augoniland about 100 miles away, is sending down large numbers to work on coffee estates this year, and the supply is likely to continue as there is an enormous population to recruit from. They only stay from 3 to 6 and 8 months. We hope, however, that better pay will induce them to engage for a longer period.

The two assistants Messrs. Moggridge and Robins have been at work on the Companys land for some months, and seem like Mr. Crabbe to like the country and tackle work with a proper spirit—apparently the proper stamp of men for this much abused country. Several new estates are being opened up in Mlanji this year, besides the Nyassaland Co.'s, viz., Messrs. Cox, Austin, and Wilsi's lands : they are all busy with nurseries and new clearings.

We must have a railway in a few years or we shall be in a terrible box for want of transport facilities. A survey has been made to connect the Shiré Highlands with the river at Chirimo, our port of embarkation (where steamers call) for the coast, and it is reported that no difficulties in the way of engineering exist along the trace : so we hope to be served by a railway in due course.

Transport has been reduced : I am sending coffee home to London for £5 per ton, £2 10s by river, and £2 10s by Reunion Line.

Tea seems to do very well here : I have as good a growth at 3 years as any I ever saw in Ceylon at 300ft. The soil and climate seem to suit it admirably. The flavour (for I have made it frequently of late) resembles very much some tea I made at Tommagong, in the Udapussellawa district. The aroma is excellent and it flushes freely, so we need not despair of having a paying product should leaf-disease ever appear on our coffee.

We have a terrible pest in borer in Mlanji district, and it is worse this year than I have seen it before, in fact it is as bad as I have ever seen it anywhere except in Travancore.

We have the two borers here—one the Zeuzera coffee red borer from the larva of a white moth with steel-blue spots common in the Uva district of Ceylon. This does not do so much damage as the other, produced from the larvæ of the longicorn beetle, the Indian white borer. They are very numerous and destructive, especially when the soil is of a deep chocolate or black loam rich in humus. They begin to hatch about March and assume the chrysalis form about July and August. For the last four months I have had a few boys catching the borers, and they sometimes bring in 20 to 30 per diem besides what they kill in the trees by means of a small wire pushed into the hole where the borer enters the tree; they are worst on coffee 3 and 4 years old.

The black and white grub from the cockchafer beetles are not so numerous as I have seen them in Ceylon, although common enough. Crickets and locusts of various kinds are about the only other enemies our coffee has, but they don't seem to do much harm except to young plants by cutting them down during the dry season.

Black and white bug are both to be seen upon orange, soursop and guava trees at times, and I have seen an occasional coffee tree with bug; but it does seem to cast or spread, probably due to the ever present ladybird beetle of which we have two or three specimens.

Nyassaland planters are going crazy about shade for coffee, and it is being experimented with by several. My observations don't support the theory that shade is required for coffee here, specially having forest trees on a new clearing as some are doing. We have some very good indigenous forest trees suitable (deep feeders that don't seem to hurt coffee) such as mahogany, malombwi, and some of the Albizzia family, locally named kalatta, sopa, aquaranyana, and chickwani: the latter four have feathery leaves which close up at night, and are very deep feeders, nevertheless they should all be felled when a clearing is being made for coffee, and young plants (to whatever kind is thought suitable by those who want shade, planted out at regular intervals, or a set distance apart after coffee is a year or so old, as young coffee plants certainly hang back when planted under standing forest shade of any kind.

I am not a believer in shade, at least in Mlanji, with our rainfall well distributed at an elevation of from 200 to 300 ft.

Our two driest months are October and November, and I have never known less than 1 or 2 in. of rain, or the thermometer rise more than 96°, and that only for one or two days just before the break of our rainy season towards the end of November. I have never seen healthy coffee dropping or losing its leaves here from drought, as I have seen in Lower Matale and elsewhere in Ceylon. Further my observations go to prove that shaded coffee here does not make wood, nor does it crop so well as that in the open. I can understand going in for shade where coffee gives little of no crop without it. Shade is in any climate undoubtedly beneficial, as an agent for manuring by means of the leaves which are continually falling, and helps to replace the ingredients removed from the soil by the coffee tree; but as I have said suitable shade must be selected. Coffee is not, however, such an exhausting crop that it cannot be grown without manuring on almost any kind of *forest* soil for at least for 8 years.

I remember seeing some very fine coffee under shade of the small wild fig tree *Ficus indica* in Lower Matale; but I was told that the coffee gathered from it was very little, compared with the rest of the estate. The unshaded coffee never looked so vigorous and green: it cropped well, while the shaded coffee did not do, although it certainly promised to last much longer.

I took charge of an estate once which was one cover of jak trees planted as shade; the place had not given a decent crop for years; so I set to work and lopped the jaks to a top, giving the coffee a good pruning, The result was double the crop next year. Although jak is considered good shade for coffee by most low-country Ceylon planters, I never thought so; At all events jaks should be thinned out of all the leaves and smaller branches or twigs once a year and buried as a green manure, to make it worthy of the name of a shade tree for any plant growing on the same ground.

Weeding in Nyassaland is not so serious an item of expenditure as in Ceylon. Although we hear some familiar friends here such as the Spanish needle and white weed. They are not troublesome except during the rainy season from November to April, during which time the growth of everything is marvellous. Some discussion has taken place lately in one planting paper as to whether coffee will or is paying in Nyassaland—the outcome of a letter written by Mr. Simpson, a Chirimo and Mlanji trader, who apparently has made some mistake in his mode of cultivation the same as some of his neighbours. In fact the three oldest estates in Mlanji have not got fairplay to my personal knowledge, Mr. Simpson included, because they were allowed to grow up to 5 and 6 ft. high, then hacked down before blossoming, and in some instances with crops set on the upper branches, where the sap naturally flows to, impoverishing the lower primaries, that could hardly be expected to blossom again. The trees were allowed to nourish magnificent suckers, 2 and 3 feet high, to be again cut or pruned off: under such circumstances how could coffee yield good crops ?

A Ceylon planter asked a gentleman, African planter, why he let his coffee grow up like blue gums, especially when his estate was wind-blown. His reply was: "the more wood and bigger tree gave more crops. After being persuaded that he was mistaken, a general stampede of knifemen were seen rushing to attack the coffee trees, and down they went to 2½ ft. I am sure any experienced coffee planter will agree with me that it would be better to allow estates to grow as native coffee than subject them to such treatment.

Another cause of poor crops such as Mr. Simpson records is owing to planting up old native gardens. Only a few years old chena land, which Ceylon men of experience know, only yields one or two crops, then struggles for existence, unless manured. This is the case with the generality of lands, although some fine coffee yielding good crops is to be found on alluvial deposits without manure.

To sum up with, I have just finished. Gathering a 5 cwt. per acre crop from a field 3 years old, which was virgin forest, but unfortunately the acreage is small, the trees look as if they had borne no crop, and I expect at least 6 or 7 cwt. next year.

Nyassaland planters are mostly a hard-headed, stubborn lot of men, above taking the advice of anybody. Consequently their experience is dearly bought: in fact they are a queer lot,

who are not very particular about the veracity of the statements they make; it is said to be the effect of the African climate!

I must now close with the promise to myself that I shall not be so long silent again. H. B.

NOTES FROM OUR LONDON LETTER.

London, Sept. 18.

LAND AND LIMITED COMPANIES.

In conversation with a gentleman of large experience in the Ceylon tea trade we discussed your remarks relative to the effect of most of the planting lands in that island passing into the possession of limited companies. That authority remarked:—"There can be no doubt that, should ever another crisis occur in Ceylon, there would be little hope of its being pulled through as former occasions of the kind have been. The loss would fall on a multitude of shareholders, whose individual stakes would be relatively small. How many of these would be likely to put their shoulders to the wheel in the way Ceylon planters have hitherto done to put things straight again. They would simply remark that the colony might go to Hongkong for what they cared. And besides that, it is little generally known how much of the capital that has been and is being subscribed towards these daily starting Indian Tea Companies and Ceylon Tea Companies is passing into private keeping. I could mention one City firm who, it has been asserted, has bagged £250,000 by its 'bringing out' of such companies. It is to be hoped that a stop will soon be put to this sort of thing; but so long as the British public rushes madly after shares in these companies, they will be accommodated by those who are making pretty pickings out of the job."

The remarks made above respecting the course of the dispute between the Dock Companies and the shipping interest had been written before the *Times* of this morning came to hand. That issue contained the information quoted in full below. Reference had been made to the rumour that the Dock Committee were seeking negotiation with the shipowners, but it was not possible for the writer to give information as to the terms on which such *rapprochment* was being sought. The extract now given will show you that the dock companies are prepared to retire from the position at first assumed by them—a position which, it is variously estimated, must have compelled the raising of freights to London by from 2s to 4s the ton.

BURGLARY AT THE PREMISES OF THE CEYLON TEA COMPANY.

The premises of the Ceylon Tea Company in Southwark Street, Borough, were broken into for the second time last week. Two of the three safes were broken open and £5 in silver stolen, as were also twenty nickel watches, the last being an item one would scarcely expect to have a place in the safes of a Tea Company. A third safe resisted the efforts of the thieves. It is two years since the last burglary on these premises occurred, when five men were captured and received sentence for their offence.

THE DIMBULA VALLEY COMPANY

has declared an *interim* dividend for the three months ended June 30th at the rate of 10 per cent. per annum on its ordinary shares. It seems to be somewhat out of the usual course to declare a dividend on so short a term, but we presume that the profits have accumulated so rapidly, that the directors are anxious to get rid of them without delay. The Highland Tea Company of Ceylon is another Company that has declared its *interim* dividend. This is for the half-year ended June 30th; and is at the rate of 8 per cent per annum, to be paid free of income tax.

COFFEE PLANTING IN PERAK.

From the Kuala Kangsar Monthly Report for July, in the *Perak Government Gazette* of Sept. 25, we take the following:—

The Gagpis and Waterloo estates, under the able management of Sir Graeme Elphinstone, are being rapidly opened up. On the former over six hundred acres have been planted in coconuts and coffee, and three hundred acres on the latter have been felled, and holed and the necessary drains and roads in a great measure graded and completed.

The Liberian three years old coffee on Waterloo is looking splendid, and a fair crop will be picked off the old Arabian trees.

A great many Malays have begun to open up small five acre blocks in coffee. I have allowed them to take a crop of *padi* off the land the first year, as I do not think it is in my power to prevent them. A great deal of rubbish has been written on this subject by officers who know nothing about what they are writing. I think Government should once for all lay down whether this is to be allowed or not, having obtained the opinion of an experienced practical planter first.

Sir Graeme Elphinstone's new estate called "Ravenwood," near Sungei Siput, is being opened up by Mr. Forrest. Sir Graeme and a Mr. Thomas have applied for another 500 acres of land on the other side of the main road to the new estate.

The Monthly Report for September has the following:—

In my report for July I made a mistake in the name of Sir Graeme Elphinstone's new estate, it "Heawood," and not "Ravenwood" as stated.

During the current month I have had applications for 1,200 acres of coffee and coconut land, viz:—500 from Sir Graeme Elphinstone and Dumraez Thomas, Esq., near Sungei Siput; 500 from Sir Graeme Elphinstone and Mr. Solomon Ramanathen, near Jenalek, on the Patani road; and 200 from Mr. Solomon Ramanathen in the Chua valley. I have strongly recommended these three applications, and hope the Government will grant them, and that at an early date.

The following figures shew the amount of work done by Sir Graeme in opening up in 1896:—In coffee:—on "Waterloo," 6 acres; on "Rumah Papan," 255 acres; on "Heawood," 20 acres. In coffee and coconuts:—on "Gapis," 277 acres. Total 558 acres.

In addition to the above, by the end of the year, Sir Graeme intends to open up another 117 acres on "Heawood," and 90 acres more on "Gapis," making more than 750 acres in the year.

If the new applications are granted Sir Graeme intends to fell 20 acres on each and put in the nurseries at once.

ROYAL GARDENS KEW.—The Bulletin of Miscellaneous Information for March and April has the following contents:—Botany of Formosa; New Rubber Industry in Lagos; Coffee Planting in Lagos; Botanical Enterprise in East Africa; Myrrh and Bdellium; Miscellaneous Notes—Mr. R. Derry, Mr. A. Parsons, Mr. C. Wakely, Mr. W. Binder, Botanical Magazine, Relief House, Palm House Heating, Douglas Spruce Spar, Pelican, Blackthorn fishhooks, Strobilanthes callosus, and Mr. Littledale's Tibetan Plants.

SUPPLY OF TEA CHESTS.

As the manufacturing season draws to a close and Managers become busy with their estimates, the annual recurring anxiety as to the supply of tea boxes for the ensuing season manifests itself, and though the majority of planters are apt to adopt the motto "*après moi le deluge*" in reference to the matter, there can be little doubt that, as years go on, the difficulty of procuring an adequate supply of seasoned wood, locally, will intensify. We are willing to admit that timber, like coal in Assam, is plentiful enough, but the getting either out to a market at a reasonable cost is the hitch. We noted in our issue of the 19th that a Ceylon firm were getting a consignment of pine shooks from the Baltic and our correspondent expressed surprise there at, venturing on the assertion that India could supply Ceylon with all her requirements, but if we experience a difficulty in meeting our own wants, we most assuredly cannot export. Of course we know that the forests in the tea districts are not the only ones in the country, and that were the Southern India timber tracts thrown open unreservedly, Ceylon could obtain ample wood from the Palghat jungles, but teak from its weight and difficulty of working, is by no means the best fitted wood for tea chests, irrespective of the powerful smell when not thoroughly seasoned, and all other suitable timber is being more jealously conserved, and very rightly so, year by year, by Government, the Forest Department apparently having at length fully awakened to the importance of securing the rainfall.

Some two years ago we suggested that an attempt might well be made to obtain pine or fir from the Siberian forests *via* Vladivostock, but can we wait until the Railway puts that port in connection with those forests? And would it not be more satisfactory to open negotiations with the "lumberers" of British Columbia *via* Vancouver? The forests of Northern Canada along the line of the Pacific Railway could, for a long time to come, furnish India and Ceylon with tea shooks, and our planters might find a new market by tapping that of the dominion from the north, without sending their teas all across the Atlantic, in most cases *via* the United Kingdom, with all the drawbacks of transhipments and passing through the hands of half a dozen sets of middlemen. Could the pine woods of Northern Asia or America be opened up freely for the tea trade requirements, we might be content to wait until some enterprising firm set about initiating the project without casting about for some novel material for our boxes. We have heard it advanced that pine is too fragile to stand the rough treatment our tea chests are subjected to, but the tea interest is sufficiently strong now to insist upon more careful handling and, moreover. the breakages among the kerosine oil cases are so few, comparatively, as to show the wood, though light, is stout and strong enough if ordinary care is observed in its treatment. Whether some more suitable material could be devised for packing our teas, those mostly concerned must think out for themselves. Many suggestions have been made and experiments tried, but somehow all return to the lead lined wooden chest, though should a trade be opened with Central Asia no doubt the packs made from pulp would be found the best that could be adopted, though when the question of opening up a trade in that direction crops up, we are inclined to think that a better chance of accomplishing success lies in the Persian Gulf route to the Kerbha River, than up the difficult passes and over the rough mountain roads of Turkistan or through Cabul to Samarcand. There is no doubt that the wood of Indian tea chests is far two heavy, and no advantage is gained in using it, for the complaints from Australia last season regarding broken boxes showed that we certainly gain nothing in strength; a comparison between a China and Assam chest is remarkable. True the former is strengthened by being cased in paper, mats and split cane, but when we come to look closely into matters, there is no doubt that Chinaman's actual box is decidedly a far superior article to our own, chiefly because the material employed admits of being more easily worked up, and were we to adopt the light pine in lieu of the thick heavy wood at present in vogue, we should get a better chest and one thoroughly seasoned, hearing in consequence less about loose packing. With the low rates of freight now ruling it would no doubt pay to send one of the four-masters with gunnies and rice to San Francisco for disposal there on ship's account, then letting, her run up to Vancouver for a cargo of pine (either in logs or planks) for this.—*Indian Planter's Gazette*, Sept. 26.

THE PINE HILL ESTATES COMPANY, LIMITED.

An ordinary general meeting of the shareholders of this Company, was held at the Company's offices, No. 20, Baillie Street, at 12-30 today.

Present:—Messrs. H. St. C. Bowle Evans in the chair, R. E. Prance, J. A. McGillivray, C. C. Herbert, F. W. Bois, representing Mrs. M. E. Bois and C. G. Ryan.

Representing by proxy were Messrs. John Masterman and F. M. Mackwood, Mrs. M. F. Thorne, Mrs. G. Prance, Mrs. A. G. S. Hughes and Mrs. E. L. Beven.

Proposed by Mr. H. St. C. Bowle Evans, seconded by Mr. C. C. Herbert and carried that the report of the directors be adopted.

Proposed by Mr. C. C. Herbert, seconded by Mr. C. G. Ryan and carried that a final dividend of 4 per cent on the paid up capital of the Company be paid at once making a total of 7 per cent for the year.

Proposed by Mr. C. G. Ryan, seconded by Mr. C. C. Herbert and carried that Mr. H. St. C. Bowle Evans be re-elected a director of the Company.

Proposed by Mr. F. W. Bois, seconded by Mr. J. A. McGillivray and carried that Mr. John Guthrie be re-elected auditor for season 1896-97 on same fees as before.

The Chairman then went on to say that the directors regretted that a dividend of 7 per cent only could be declared, but that the profits for the current season (1896-97) would, they hoped, enable them to declare a good dividend, as if the crop netted 50c per lb. a 16 per cent dividend would be realised. He also pointed out that by the figures shown in the Report, Pine Hill and Wavahena has earned 13½ per cent for the past season and Nahakettia only a little over 2 per cent and it was therefore owing to Nahakettia that the dividend was so small. Nahakettia, he was glad to say, had been sold, and the Company's position, with the large Reserve Fund amounting to 10 per cent of the reduced Capital, was, the Directors considered, a very sound one.

After the above business was concluded the meeting resolved itself into an extraordinary general meeting and confirmed the following special resolutions:—

1st.—That the Directors be authorised out of the purchase money arising out of the sale of the Nahakettia Estate, amounting to R190,000, to refund to each Shareholder of the Company a sum of Forty Rupees per share in reduction of the Capital amount subscribed in respect of such share.

2nd.—That the Capital of the Company be reduced from R355,000 in 3,550 share of R100 each (being the amount to which the Capital of the Company was increased by special resolution passed on the 19th May, 1894, and confirmed on the 16th June, 1894,) to R213,000 in 3,550 shares of R60 each.

The meeting closed with a vote of thanks to the chair.

The following is the report by the Directors :—

Your Directors submit their Annual Report and accounts for the 12 months ending 30th June, 1896.

The Tea Crop from the 3 Estates was 5,209 lb. over the estimate, but the estimated 250 bushels of parchment Coffee from Nahakettia Estate was represented by 85 bushels only.

Pine Hill and Wavahena Tea Crop amounted to		..	117,723 lb.
Out-turn purchased Tea	do.	..	14,264 ,,
Nahakettia ..	do.	..	112,486 ,,

The working profit for the season amounted to R25,880·78, contributed as follows :—R21,601·51 by Pine Hill and Wevahena and R4,279·27 by Nahakettia.

The amount available for dividend after payment of the interim dividend of 3 per cent on 21st Feb. 1896, stands at R15,296·78 equal to an additional 4 per cent or 7 per cent for the year—which your directors propose to deal with as follows :—

To payment of dividend at the rate of 4 per cent	R13,916·00
Leaving a balance to be carried forward	,, 1,380·78
	R15,296·78

Since closing the accounts, the sale of Nahakettia Estate for the sum of R190,000 has been completed, showing an apparent profit of R6,417·56 over the amount it stands at in the Company's books, but the actual profit cannot yet be ascertained, on account of claims for short area, involving survey costs, a claim for sale commission, and also heavy costs to pay for the expense and trouble of writing down the Company's Capital from R355,000 in 3,550 shares of R100 each to R213,000 in 3,550 shares of R60 each.

The Directors do not add anything to Reserve Fund from profits as a sum of R14,300 from the Nahakettia sale money is added thereto.

The estimated Estates' crop for season 1896-97 is put at	150,000 lb. tea.
and from purchased leaf ..	15,000 do.
	165,000

According to the Articles of Association, Mr. H. St. C. Bowle Evans retires from the Directorate, but is eligible for re-election.

WHO DISCOVERED THE TEA PLANT IN INDIA?

TO THE EDITOR OF THE "ENGLISHMAN."

SIR,—As one who many years ago entered on this *vexata questio* and endeavoured to solve it, I am interested in what your "Special Commissioner" has so graphically said on the subject in your impression (Dak Edition of this morning.)

The destruction by fire of my library of rare and valuable books on India in 1882, and the—to me irreparable—loss of my MMS. on History, Natural History and Shikar, prevents my being able to verify my statements by referring to the authorities on which they are based, and I have, therefore, to trust more or less to memory which at best cannot be considered as absolutely reliable. At page 145 of my "Historical and Topographical Sketch of Calcutta," which originally appeared in your "Saturday Evening Journal" more than twenty years ago, occurs the following footnote :—

"In this year (1825) the tea plant was discovered in India. It was found in the district of Tejpur, Assam, by Major R. Bruce and his brother, Mr. C. A. Bruce. Various other persons claim this honour, but it is generally allowed that the brothers Bruce were really the discoverers of the tea plant in this country."

Subsequently I gathered additional evidence on the subject, and wrote a paper on it, which was reproduced in Wyman's "Tea Encyclopædia." I think it was there satisfactorily established that the late Major R. Bruce was the actual discoverer of the indigenous tea plant in India. Not having Mr. Wyman's work at hand to refer to, I am unable to forward a copy of the said article; but, as the subject is of some interest to those connected with the tea industry in India, you may be disposed to publish it from the above book should it be in your Editorial Library.

In connection with this subject I may state that as the tea plant is not found in a wild state in China, and is indigenous to India, ergo, botanists are wrong in designating it *Thea Chinensis*; the above specific name ought once more, I submit, to be changed to *Indica*, in accordance with the recognised rules of scientific nomenclature. But it is said that a myth is as difficult to kill as a cat, aye, and more so, and this scientific misnomer, if I may be permitted to so call it is likely to be perpetuated. The Buddhist legend about the tea plant being carried from India to China by a priest* is evidently based on historical facts.

H. JAMES RAINEY.

Rainey Villa, Khulna, Sept. 21.

* Perhaps Theosophists would be disposed to claim him to be one of their mysterious Mahatmas.

LANTANA—THE FOREST'S FRIEND!

I think "Velleda," though he jested on the subject of *Lantana* in your March issue, may like to read the annexed extract from the Coorg Annual Report for 1894-95. Mr. Lawrie effectually disposes of the "Forester's friend" theory, and clearly shows that, though *Lantana* "takes possession of the soil," it does not later on protect the young plants of valuable species as "Velleda" thinks.

It may interest your readers to know that in Berar, where the *Lantana* was an undoubted pest, steady work for three seasons at an expenditure of some Rs. 17,000 has practically eradicated the shurb, and all that is now needed is the destruction for a few years to come of seedlings and any plants overlooked in the first clearing. The expenditure in the future will be trifling, as one very satisfactory feature observed is the absence of shoots from roots left in ground, and the comparatively few seedlings observable after two years' careful work.

I may mention the fact that the Central Provinces Forest Administration has warmly supported Berar in eradicating *Lantana*, and has carefully destroyed any isolated shrubs found in Betul and Nimar. All these shrubs were apparently sown by birds which love the sweet fruit borne by *Lantana Scandens*.

C. BAGSHAWE.

P. S.—May I warn your Bombay readers of the danger of introducing *Lantana* hedges. I hear this is being done in the little hill station of Panchgani, and I fear it is certain (as it did in the case of Chikalda, which is much like Panchgani) to lead up to very insanitary conditions.

Extract from Coorg Forest Report, 1895-95, by A. E. Lawrie, Deputy Conservator of Forests.

"I am sorry I cannot endorse the opinion of my predecessor regarding seedlings of *matti biti* and *home*, found under impenetrable clumps of *Lantana*. One has only got to see a stretch of *Lantana* in all its glory, and it will not take long to find that these light-loving seedlings stand absolutely no chance. Even sandal itself cannot stand very thick *Lantana*. Lately I have had a few lines opened through dense *Lantana* where sandal had been sown some five years ago, and which were known to have germinated excellently, and for two years were not lost sight of, but in the third were completely covered over with *Lantana* and entirely lost sight of. In these lines, for every one weedly sandal nearly a hundred dry rotted stams were found from three to four feet high. *Lantana* as a nurse growing and as a hedge no doubt is very good; the stems if not burnt rise some feet up and then curve down on either side, allowing a fair amount of side light to reach any seedling springing up under it, and here the seedlings shoot a head protected from cattle and other animals. The other great drawback to *Lantana* and which makes it anything but the Forester's friend is in the matter of fires; for once a fire enters a *Lantana* stretch the entire area is bound to be gutted. In any case, if it can be prevented, *Lantana* should not be allowed to take unlimited possession of the ground.

GOVERNMENT BOTANICAL GARDENS, SAHARANPUR AND MUSSOORIE.

From the report on the progress and condition of the Government Botanical Gardens, Saharanpur and Mussoorie, for the year ending 31st March 1896, we make the following extracts:—

CULTIVATION: FRUIT CULTURE.

Crop.—The mango crop, the chief and most profitable of the fruit crops of tho country in a good year for that fruit, was for the second season in succession extremely light. The trees flowered fairly well, but owing to the presence of insect blight they did not set fruit so plentifully as the show of blossom would lead one to expect.

It may not be quite in place to draw comparisons between the past and curreut season in a report supposed to be only dealing with the past one, but I cannot help remarking, even at the risk of it being considered so, on the profuse manner in which the mango blossomed this spring. Almost every tree met with was laden with blossom from top to bottom and so profusely in many instances that the foliage was entirely hidden by the flowers. Notwithstanding the great show of blossom, the crop of fruit during the coming season will be again light. Insect blight was not present to any great extent, nor were there unseasonable showers of rain while the trees were in flower: therefore I can only account for the lightness of the current crop to the extreme dryness of the air caused by the prolonged drought, having possibly withered up the organs of fructification before fertilisation could be effected.

Bers, lichees, loquats, peaches, pears, plums and oranges yielded average crops, but the yield of *limes*, lemons and grapes were considerably below the average.

The amount realized by the salo of fruit was R1,355-8-0, or R69-7-0 more than was realized from tho same source in the previous year.

American Dewberry (*Rubus trivialis*).—This useful small fruit is gradually becoming better known to growers of fruit in this country. During the past year 147 plants were distributed against 30 plants in the previous year, as noted in former reports the fruit is of little use for dessert, but it furnishes an excellent preserve and on that account alone is well worth growing.

The plants forming the garden plantation of dewberry were all raised from seed, it had been noticed during the past season or two that the quality and yield of fruit of individual plants varied considerably. A selection of offsets from the largest fruited and most prolific bearers was therefore made during the past cold season and transplanted to a new plot of ground. When the newly made plantation comes into bearing the quality and yield of fruit is certain to be fairly even and better than is now produced by many of the seedling plants forming the old plantation.

Arabian Date Palm (*Phœnix doctylifera*).—Since submission of the last annual report 25 plants of the Arabian Date Palm have been killed by the palm borer, *Rhynchophorus ferrugineus*, but the mortality would not have been quite so great if the plants had been allowed to linger on until they died.

With a view of trying to completely eradicate the pest every individual plant was carefully examined and all plants that were suspected of harbouring the pest were uprooted and burned. Many of the plants looked fairly healthy when uprooted and in such cases the only sign of the presence of the insect was premature withering of the lower leaves of the plants. As all suspected plants were found when uprooted to be attacked by the borer, premature decay of the lower leaves has proved to be a sure sign of the commencement of an attack. In future as soon as premature loss of the lower leaves is noticed plants showing such symptoms will be at once uprooted and burned.

Three of tho plants are for the first time carrying a crop of fruit, but as it will not ripen until towards the middle of the current summer, comment on its quality will have to stand over to the next annual report.

Avocado Pear (*Persea gratissima*).—In the garden report for the year 1892 mention is made at paragraph 52 of the thriving and promising condition of three specimens of this tropical fruit tree.

Last season one of these specimens bore and ripened a few fruits for the first time. I was absent on furlough when the fruit was in season, but the native head gardener describes it as being similar in size and shape to a good specimen of the common pear and pale green in colour when fully ripe. To his taste the pulp proved insipid and nauseous and far from agreeable. The fruit is described in works of reference as being highly esteemed in the West Indies and tropical America, though strangers at first do not like it. It is never eaten as gathered from the tree, but is always flavoured with spice, lime-juice or pepper and salt. When its own peculiar flavour is disguised by the addition of these adjunets all lovers of fruit are said to soon acquire a taste for it.

The Avocado, or Alligator Pear as it is also called, is not likely to become a common fruit tree in Northern India; but as it is a nice evergreen and ornamental at all seasons of the year, it is deserving of a place in the garden on that account alone.

The seeds are also said to be of economic value by yielding a deep indelible black stain useful for marking linen.

Ber (*Zizyphus jujuba*).—The Mauritius variety of jujub plum, made mention of at paragraph 54 of last annual report, were transferred from pots to the open ground early in the cold weather. The plants have not made much progress since being planted out, but they look strong and healthy and give every promise of making good growth as soon as the monsoon rains begin.

Blackberry Everbearing (*Robus fruticosus*).—This fruit-bearing bush still gives promise of being as well adapted for culture in this climate as its congener the dewberry. The plants mentioned at paragraph 57 of the last annual report as having been planted alongside of the latter have made excellent progress. One of the largest plants bore a few fruits this season for the first time, but as they were picked off by birds before they were fully ripe I can unfortunately offer no remarks upon its quality.

For the present all that can be said of it is that it gives every promise of being a success, but it will have to undergo observation for another season before more reliable information can be given about it.

Fig (*Ficus carica*).—The Japanese figs continue to make the same slow progress as reported of these varieties in former reports.

A few of the plants are bearing a small crop of fruit this season, but as it will not ripen until sometime after the date of the despatch of this report comment on the quality of the fruit will have to stand over until submission of the next annual report.

Loquat (*Eriobotrya Japonica*).—The small plantation of loquat plants raised from seeds received from the Governor of Malta has not made such good progress as anticipated when it was reported on in paragraph 61 of the last annual report.

Several of the plants died last season, but all blanks have been filled up from the reserve of plants maintained in pots.

The Malta strain of loquat looks robust and apparently as well adapted to this climate as our own as long as it is under pot cultivation, but when transferred from pots to the ground it gradually falls into an unthrifty condition and dies off. The soil of the plantation is of good average quality, so at present I am at a loss to account for the Malta kind doing so badly. The tree is a native of Japan, and the Malta strain in common with our own must have originally been introduced from the former country. It is therefore curious why a tree of common origin should be found delicate in India after undergoing a course of cultivation for a series of years in Malta.

Orange (*Citrus aurantium*).—A very fine variety of the Malta blood orange fruited last season for the first time. The plant was received in 1888 from Dr. Bonavia when Superintendent of the Jail at Etáwah, with the remark that it was a layer of a variety of

Malta orange taken from a tree in the habit of bearing fruit out of season. The plant made very slow growth for many years, but during the past two seasons it has made better progress and now stands as a specimen 8 feet high and about the same in spread.

The fruit is much smaller than that of the common Malta blood orange, but deeper in colour and of much finer flavour. Its slow rate of growth and shy bearing habit is certainly not a recommendation, but when it is worked on the lime stock it may prove as quick growing and prolific as other varieties of Malta orange.

A few plants have been raised by budding it upon the common sour lime, and as soon as ready these will be permanently planted for future observation.

As most of the varieties of oranges of recent introduction have been fully described in former reports there is nothing further of general interest to add under the head of this fruit.

PEACH (*Amygdalus persica*)—Seeds of a variety of peach were presented to the gardens two years ago by a native gardener under the name of Gujarati peach. He described it as being a dwarf bushy form of the tree never exceeding a height of 3 or 4 feet when fully grown, and judging from the present appearance of the plants his description is likely to prove correct.

The plants are now two years old, and although only standing about one foot high they flowered most profusely this season and set fruit. The latter unfortunately dropped before ripening owing to shifting the plants from the small sized pots they were in when they flowered to pots of larger size. I am therefore not in a position to pass an opinion upon the value of the variety, but as it is so distinct in habit from all other forms of peach its progress will be closely observed and communicated in future reports.

There is nothing of interest to place on record regarding other recently introduced kinds. Bidwell's early peach is one of the best of these, but for general planting no variety is more reliable than the selected forms of the common peach of this district. Attention is therefore constantly devoted to keeping up a large stock of young plants of the best forms of these for distribution.

PEAR (*Pyruscommunis*).—The two varieties of pears, *viz*., the "La Conte" and "Kieffer," introduced a few years ago from Florida, again bore a small crop of fruit.

Mr. F. W. Seers, who was officiating as Superintendent of the garden when the fruit was in season, in a note he left behind him, states that owing to the attacks of hornets, pilfering and other causes, he was not able to secure a single specimen of either of the varieties ripened naturally upon the tree. The fruit he tasted was gathered while hard and green and artificially ripened under cover. In spite of having been matured under such conditions he says it ripened after having been kept for a period of ten days to perfection and was of very superior quality.

In paragraph 73 of the last annual report I stated that I considered the "La Conte" pear to be one of the best introductions in the shape of fruits secured by the garden in recent years. The Kieffer" variety had not fruited when that report was written, but as Mr. Seers considered the fruit it produced last season to be as good, if not better, than that of the "La Conte," both pears are without question a great advance upon the common country variety and both cannot be too strongly recommended for general culture on the plains.

A fair stock of young plants of both varieties is available for distribution grafted upon the country variety of pear. It has to be proved yet if the latter is the best procurable stock for these Florida pears, but as it has a strong root and is possessed of much natural vigour, I see no reason why it should not prove to be as good a stock as can be found.

Persimmon (*Diospyros Kaki.*)—This is another of the recently introduced fruits to which attention has been paid by the garden.

Mr. Seers, the Officiating Superintendent, reports that several trees bore a few fruits last season, but unfortunately with one exception they all dropped while in an immature state.

He describes the specimen which attained to maturity as bearing a close resemblance in shape and colour to an obtuse conical tomato. Measured with a tape the circumference was eight inches, length from base upward four inches, and colour reddish orange.

Sir Edward Buck, Secretary to the Government of India, Revenue and Agricultural Department, happened to be on a visit to the garden when the matured specimen of fruit was gathered and it was submitted to him by Mr. Seers for an expression of opinion and I believe he pronounced it to be very good.

As several of the trees are carrying good crops of fruit this season I hope to be in a position to give further information about this fruit in the next annual report,

A small stock of seedling plants are available for distribution, but it will be some time hence before the gardens can supply plants in unlimited quantity.

PLUM (*Prunus domestica*).—The varieties of plums made mention of in former reports as having been introduced from Florida and Japan continue to grow very slowly and so far give no promise of bearing.

Unfortunately they are not planted in a position for giving them a fair test. The plot of ground they occupy consists of good soil, but it is much overshadowed by other trees. It is intended during the current season to plant a few plants of each of the new kinds in a more open spot and note the result.

VINE (*Vitis vinifera*).—The vine plantation planted in 1893 is making fair progress, but as this fruit bears so poorly in this district, the care and attention given to the plantation has only been sufficient to cause the plants to furnish enough wood to meet the demand for plants and cuttings which is made upon the gardens by other districts.

As plants and cuttings command a fair price, the garden realizes more revenue and is really doing more good for the country at large by only studying to meet the demand for plants and cuttings than by solely devoting its attention to cultivating the vine for the fruit it might yield.

WINEBERRY (*Rubus phœnicolusius*).—I regret having to report the total loss of all the plants of this new fruit.

In the last two annual reports I noted its evident dislike to the excess of moisture we have in the atmosphere and soil during the monsoon season. Four plants of the original large batch of seedlings proved strong enough to last through two rainy seasons, but the heavy rainfall of the past monsoon proved to be more than the plants could stand, so they all died off from the effects of damp.

The fruit of the wineberry, though much praised by the New York seedsman who placed the seed upon the market, is, I believe, of little value: therefore the total loss of the plant is of minor importance.

VEGETABLE AND FARM CULTURE.

95. The leading standard varieties of summer and winter season vegetables were grown on the same scale as in former years.

96. As vegetables are grown by this garden chiefly for seed, cultivation was largely confined to kinds that have been proved to give good or fair results from acclimatized stock. It is not claimed that the latter is better than imported seeds of the same kinds, but by constant selection, it has been found it can be kept up to a fair standard of quality, can be sold much cheaper, and in the case of some kinds practically gives as good results as the more expensive imported stock; this branch of garden work is therefore on the whole of considerable economic usefulness.

97. The list which follows is a detail of the chief kinds grown and weight of seed harvested of each. I may add that the bulk of the seed collected was disposed of by sale or by free issue to soldiers' garden.

COW PEA (*Vigna Catiang var*).—Although I mentioned this plant in last year's report, I think it desirable to again draw attention to it.

The plant furnishes excellent forage for cattle in the rains, while the young pods can be used as a table vegetable and form a good substitute for French beans.

A large supply of seed was harvested last season, most of which is available for distribution.

CARROTT, SHORT WHITE (*Daucus Carota*).—Mention is made at paragraph 95 of the last annual report of the introduction of this new form of carrott.

Roots of the new variety were planted out with a view of raising acclimatized seed, but I regret to say they failed to flower: so the variety has for the present been lost.

CLOVER EGYPTIAN (*Trifolium Alexandrinum*).—A supply of seed of a clover was sent by the Director of Land Records and Agriculture, N.-W. P. and Oudh, under cover of his No. 1889, dated 23rd November 1895, for trial and report.

The variety was not received under a distinctive name, but it proved to be Egyptian Clover, a kind experimented with here in the years 1884 and 1885.

The crop much resembled lucerne, but I consider it far from being equal to the latter as a fodder. It bears cropping fairly well in the early part of the cold season, but as it begins to wither when the hot season has fairly set in, and usually completely dies off in the rains, it is therefore not possessed of the perennial habit of lucerne, and for this reason is much inferior to it for cultivation in India.

106. A small supply of seed has been gathered, part of which is available for trial in other districts, but I can only recommend it to be tried in districts higher up in the Panjab where the climate is cooler and drier than here.

107. BEAN, IRVINE'S HYBRID PERENNIAL (*Phaseolus sp.*).—Mention is made of the introduction of this bean at paragraph 98 of the last annual report.

108. When last reported on the plants had died down to the ground, but as there was life in the fleshy root when the report in question was written, it was hoped that these would ultimately sprout and give a crop.

109. A few of the roots made an attempt to grow but the shoots they produced never looked healthy, and, after struggling on in an unhealthy state for some time, the plants all gradually died off.

110. In America this bean is held in high estimation, but it does not appear to be suited to the climate of this country.

Sugar Cane (*Saccharum officinarum*).—No seeds were received from any source during the past year, so it was not possible to repeat the attempts of past seasons to raise this crop from true seed.

A small supply of canes, representing the varieties cultivated in the neighbourhood of Lucknow, was received from the Superintendent of the Government Holticultural Gardens, Lucknow, and are now under culture in this garden.

As several of the kinds are distinct and look superior to the varieties grown by the zamindars of this district, their attention will be drawn to the Lucknow sorts as soon as the garden is possessed of sufficient stock for distribution.

SISAL HEMP (*Agave rigida var Sisalana*).—The Sisal hemp appears to have found a congenial home in this climate. The plants are growing vigorously and have made as much growth as the two common Agaves of the district could have shown in the same length of time since date of planting.

A small quantity of the fibre was prepared and submitted to the Reporter on Economic Products to the Government of India for an opinion.

He declared it short and deficient in strength, but this was due to extracting it from the leaves before the latter had attained to maturity. When the leaves are fully matured I have no doubt it will show improvement both in length and strength.

The plants are freely producing offsets or suckers, most of which are available for distribution.

As the plant is seldom asked for by the public I would suggest that jails, which make a speciality of cultivating the common Agaves for the production of fibre for the manufacture of matting, be informed by circular that plants of the Sisal hemp are available for trial on payment of freight.

RHEA (*Boehmeria nivea*).—A considorable number of requests were received during the year for seeds, cuttings and roots of this fibre plant; also for information as to how to grow it, all of which were met with as far as possible.

A company has lately been started in Bombay to work a newly discovered process for cleaning and preparing the fibre for the spinner. The attention it has attracted has awakened renewed interest in the plant, and as the demand for it is likely to increase, arrangements will be made during the current season to further the increase the area under it in order to meet the anticipated increased demand.

I have not much hope of ever seeing the plant become a paying crop in the comparatively dry climate of the North-Western Provinces, but this is no reason why the garden should not do all that lies in its power to assist would-be growers in providing themselves with a supply of plants for experiments.

RUM PLANT (*Strobilanthes flaccifolius*).—Last year I noted that this plant (the wild indigo of Assam) had completely failed under trial in the open ground, but that it would probably succeed under shade.

In consequence of the total loss of the plants that were planted out, the stock was reduced to a single pot specimen. A fresh stock of plants is gradually being got together from cuttings supplied by the surviving plant, but as they are not sufficiently strong for the ground they are at present being nursed in pots. As soon as these plants are ready for the ground, they will be planted out under shade and the result duly noted in a future report.

SACALINE (*Polygonum sachalinense*).—I noted in the last annual report that the growth of this new forage plant had been slow and after another season of trial the same remark still applies to it.

The plants are fairly healthy, but instead of producing shoots from 12 to 14 feet high as claimed for it by the seedman who advertised the seed, the greatest length of stalk so far produced has not exceeded 2 feet.

As the roots become older and stronger, the length of stalk may increase, but it gives little present promise of ever proving a good forage plant in this climate.

ARBORICULTURE.

Services were, as usual, rendered by the Superintendent of the garden to the Board by advising, inspection and aiding it in every possible manner to improve and advance the road arboriculture of the district.

In accordance with orders conveyed by the Director of Land Records and Agriculture, North-Western Provinces and Oudh, in his letter No. 258—V.-164, dated the 7th November 1895, an experiment was made with a paint recommended by the Reporter on Economic Products to the Government of India for preventing the attacks of white ants upon growing trees.

For the information of all who may feel interested in remedies for destroying white ants, I have thought it desirable to here give the recommendation for the trial of the paint in detail, followed by a report on the result of an experiment made with it on a few trees on one of the Saharanpur roads.

"EXTRACT FROM THE AGRICULTURAL LEDGER, SERIES 1895, NO. 9.

"*Paint used against white ants.*

"During a brief visit to the Native State of Gondal, the writer recently gave this subject considerable attention. There seemed to be no doubt that His Highness the Thakore Sahib, by his enlightened action in this matter, had effected a radical improvement. The trees throughout his State were all painted as described, and not a single tree could be found showing the mud encasements so characteristic of the presence of white ants. And very possibly, as a consequence of the care bestowed on these trees, they were healthy and vigorous, while those in neighbouring States were sickly and badly attacked with white ants. In consequence of these observations the writer asked for information as to the composition of the paint which had been used. He was informed that the red colour was merely to indicate

the fact that the trees had been painted, and that it was for the most part red ochre. The useful ingredients were said to be as follows:—

1 part dekamali gum (the resin of *Gardenia gummifera*).
2 parts asafœtida,
2 parts bazar aloes.
2 parts castro-oil cake.

"These are well pounded, mixed and kept in water for about a fortnight. When thoroughly united, and what may be called decomposed into a thickened compound, water is added in order to bring it to the consistency of paint and the colouring matter then added. The mixture is now ready for use, and if thoroughly applied for about two feet will check not only the attacks of white ants, but of red ants and other insect pests. Its effect will last for two years or more. The cost of the preparation comes to about 4 to 5 rupees per 100 trees. But according to the information furnished from Gondal, *al* refuse possesses no special properties; from other parts of India the reputation is very general that it is of great value. The red ochre, added to the above preparation, may not only be useful as indicating the trees that have been painted, but give a useful consistency, if it does not serve to mechanically hold the other ingredients."

The paint was prepared according to the directions given by the Economic Reporter to Government and applied to a number of mango, shisham and siris trees on the Sirsawa road that were badly attacked by white ants. Before applying the paint the coating of earthy matter deposited upon the trunks of the trees by the ants was removed, and in all instances where the earthy deposit was entirely removed the paint has, so far, had the effect of preventing further attacks by the ants upon the trees. In a few cases the men employed on the work of painting overlooked strips of earthy deposit lying in hollow channels on several of the trunks of trees operated upon. The strips of earthy deposit overlooked were painted over together with the cleaned portion of the trunk but the ants took no notice of the paint when applied to the outside of their earthy runs, and therefore made use of the strips that were left as passages to communicate with the upper portion of the trunk, where they continued their attacks as before the application of the paint. The experiment has therefore proved that the paint is an effective against the attacks of white ants if applied directly to the bark of attacked trees, but that it is of little use if applied without first entirely removing all earthly ant deposit from the trees.

The trees experimented upon were 29 full grown specimens averaging from 2½ to 3½ feet in diameter. Ingredients for paint to the value of Rs. 13-3-0 were purchased, but as the full quantity was not used, the actual cost of painting the 29 trees operated on was Rs. 7 or at the rate of 3 annas 10 pies per tree nearly. I therefore consider the paint too expensive for extended use on large sized trees, but its cost would not be prohibitive for use on young trees or saplings. In districts where it is found exceedingly difficult to establish the commonest and hardiest of roadside trees owing to the presence of white ants, the paint would, I feel sure, prove most useful.

EXOTIC PLANTATION.

There is little to place on record under this head this season. Owing to the prolonged drought some of the species of trees under trial in common with many other timber trees throughout the garden have shown considerable difficulty in throwing out new foliage this year, but with this exception the trees are making as good progress as can be desired.

The Eucalyptus trees continue to yield a steady income by the sale of leaves for making up the decoction used for cleansing the boilers of locomotives. The quantity of leaves thus disposed of during the year was 50 maunds, or exactly the same weight as sold last year. As the leaf is sold at the rate of R2 per maund, R100 was realized from this source.

MUSSOORIE GARDEN.

Great assistance was as usual rendered by this garden to the parent institution at Saharapur by furnishing it with supplies of fruit trees, orchids, bulbs and roots of various kinds, seeds of Himalayan trees and shrubs, &c., for exchange purposes with kindred instutions in all parts of the globe.

A considerable number of fruit trees comprising apples, apricots, pears and plums were permanently planted out last cold season.

The plots of ground where planting has been done were formerly used for growing such crops as Indian Corn and various kinds of Cucurbitaceous vegetables for seed for distributions through the larger institution at Saharanpur; but as the latter finds it can produce a sufficiency of such seeds to meet all possible demands, it was considered it would in the end prove more profitable to extend the area permanently under fruit, and almost entirely do away with the cultivation of seed crops.

Owing to the heavy rainfall in the year 1894 and early part of 1895 a considerable part of the woodwork of the green-houses gave way to the action of damp. The decayed parts were, however, lately replaced with new material, so the houses again stand in a fair state of repair.

APPLE (*Pyrus malus*).—The overseer of the garden reports that a few fruits were produced last year for the first time by a variety of apple introduced a few years ago from Japan. He describes the fruit as being of medium size, rich golden yellow in colour, flesh mealy, juicy, and of a very pleasant sub-acid flavour.

The variety is remarkable for its dwarf bushy habit. It has been under cultivation in the garden for about 5 years, but the largest plants are not above four feet high, and as they are bushy in proportion to their height they have more of the appearance of dwarf bushy shrubs than of apple trees. If the variety proves to be a prolific bearer, it should, owing to the small amount of space it occupies, prove useful for planting in gardens of limited area.

I am somewhat disappointed with the Bismack apple, a variety specially noticed in former reports owing to the many special merits claimed for it by the European Horticultural Press when it was introduced.

I have not had an opportunity of examining and sampling the fruit in a ripe state, but Mr. F. W. Serrs, who officiated as garden Superintendent during the greater part of the time I was on furlough last year, describes it as follows:—

"The Bismack apple produces a large handsome, taking looking fruit with an attractive and somewhat peculiar scent all its own, but to a certain extent the apple is a fraud as it remains distinctly tart when quite ripe, and is only suited for cooking."

One of the special merits claimed for the above apple by its raiser was its adaptability for culture and bearing in hot climates. With a view of testing this special claim a specimen was planted at Saharanpur. It has made far better growth than those at Mussoorie, but so far it has failed to ripen fruit.

CHESTNUT GIANT OF JAPAN (*Castanea vesca*).—This plant still continues to make very slow progress. The plants are in a healthy condition, but as they only make a few inches of growth in the course of a season the soil and climate does not seem favourable for promoting good average growth. I therefore fear that this variety of sweet chestnut must be looked upon as a failure at Mussoorie.

DEWBERRY (*Rubus trivialis*).—A few plants of this small fruit were sent from Saharanpur two years ago to the Mussoorie garden for trial. They have made rapid growth for the time they have been planted and are reported by the Overseer to be bearing an abundant crop of fruit this season. This bush can therefore be recommended with confidence for culture both on the hills and plains.

PEAR (*Pyrus communis*).—The Japanese varieties of pears mentioned in former reports still continue to make good progress but as they have not yet attempted to fruit, nothing worthy of note can at present be said about them.

Plants of the two varieties of pears from Florida which have proved such a success at Saharanpur have been planted alongside of the Japanese kind and the progress of which, will be duly noted in future reports.

TREE TOMATO (*Cyphomandra betacea*).—This continues to thrive and bear abundant crops of fruit every year, but as plants and seeds have not been in much request lately, I fear this fruit is not so well-known as it deserves to be.

The plant is utterly useless for culture on the plains, but it thrives admirably in the hills, especially when grown in low well sheltered valleys. It is a rapid grower, of easy culture, and as the fruit travels in good condition to great distance with a minimum of care in packing, it deserves more attention than it has hitherto received. It is in season from September to end of November and even later when frosts hold off, and as fruit is as a ruler scarce everywhere during that period, it would, I am sure, be in good demand if settlers in the hills would take its culture up, and bring it prominently to the notice of dwellers in the plains.

The garden can only cultivate it on a limited scale owing to want of room, but as a good supply of plants and seeds is always on hand, it is in a position to give growers a fair start when they apply to it for aid.

WALNUT (*Juglans regia*).—A variety of walnut raised from seed procured from France some years ago fruited last season for the first time.

The Overseer of the garden reports the nuts to be somewhat hard-shelled, but very much larger than the best of the nuts produced by the old established local varieties.

As the tree is carrying several dozens of nuts this season, I shall soon be in a position to raise a stock of plants of this improved form of the walnut for general distribution.

The single specimen of *Kaghzie* or thin-shelled variety of walnut, noted in former reports as having been raised from seed sent by a Forest Officer from Upper Burma, is making excellent progress, but it will still be some years hence before it may be expected to bear.

JALAP (*Ipomœa purga*).—There is nothing of any importance to record regarding the condition of this medicinal root.

It is still subject to the fungoid disease that appeared upon it some years ago, and owing to its attacks the rate of increase still continues slow.

A supply of tubers will always be avilable for trial in other hill districts, but I fear the latter can never be produced in quantity within the garden itself.

Saharanpur, the 25th May 1896. W. GOLLAN.
Superintendent, Government Botanical Gardens,
N. W. Provinces.

TEA-PLANTING IN CEYLON.

That delicious cup of tea my friend the tea-planter gave me lent me a mental fillip that was evidently not meant to be wasted on small talk, so I hinted I should like to see his Ceylon photographs. While discussing them, with the pin of judicious curiosity I lured from him the winkle of information which was my aim—namely, an account of life as it is lived by Europeans in this interesting island of the south. So warm was my friend's enthusiasm, that his account of things naturally fell into a dithyrambic rhythm. This I have reduced to its lowest terms for readers of the *P. M. G.*

In Ceylon the development from night to day is very rapid; at second cock-crow, in the twinkling of an eye, or in the life of a cigarette, one may appreciate the change, and the *appuyah* (head servant) is at the manager's door, summoning him to the arena of work, the factory. Around this is the muster-ground for a strong force of Tamils and Cinghalese artisans, among whom his colleague, the assistant manager, is busy distributing the labour of the day. These two are perhaps the only Europeans on the estate, the next in the hierarchy being a native the tea-maker, who controls the factory. Below him comes the kangany, who is a kind of headman on the estate owning coolies. At the advent of the manager the sleepy activity of the factory is accelerated into a semblance of bustle. The engine is a spluttering, withered tea-leaf of yesterday's gathering comes shooting from the first and second floors into boxes, and, when the weights have been duly pencilled on a slate, it is trundled away to the rollers. The engine is moving a "Rapid Roller" holding 270 lb. of leaf, while the 16 foot water-wheel is driving two smaller rollers, which manage 90 lb. between them.

In the tea-room, meanwhile, you may see coolies busy at emptying bins and bulking the tea, *i.e.*, heaping it into a mass and continually throwing the bottom to the top, so that the sample may be as uniform as a slice of well-stirred Christmas pudding. After bulking, the tea is put through a process of extra firing in a desiccator, so that the villain moisture may not lay his spoiling hand on the produce, and is finally stowed in lead-lined chests. By 6·30 the assistant manager has set all the wheels in motion, and after his superior has smiled approval, returned to his light morning meal, the *piece de resistance* of which is a cup of tea. The manager harks back to the bungalow, and gets through some general business and consultations. At 7.30 the ponies are brought round, and a tour of inspection of works in hand is begun. Here are men pruning, or draining, or road-making, and there the leaf is being plucked by some eighty women under the superintendence of kanganies, who will have somewhat to say to them if the greatest care is not exercised in the operation. And so by 10.30 our manager has earned his breakfast. While he is making the hearty meal which belongs to honest morning endeavour let us watch more closely the women and boys at work. As they move quickly from plant to plant—the average stature of each being half their own height—they take only the two top leaves and the bud, leaving on the tree one leaf from which the new flush is to be thrown. At a good flush each woman will bring in some 30 lb. of leaf in a day of ten hours. In Ceylon gathering goes on all the year round, and every bush is thus handled every ten days. The leaf that has been gathered is laid to wither on horizontal blinds of jute hessian, and on the following morning it has an appley scent and is ready for the next process of rolling, which is to give it the necessary twist. It is rolled for three-quarters of an hour, and then fermented for half an hour, before undergoing another turn of rolling. But the times for withering, rolling, and fermenting vary according to the weather and the quality of the tea. Strong teas must be withered long and rolled hard.

After breakfast arrives the postman with the managerial letters, to which replies are sent at leisure and entrusted to the tapal-runner, or fast-running coolie, carrying a padlocked tin box on his back. A midday siesta follows, and about half-past two the principal works are again visited. Then at four o'clock a horn, called the kavalkarren, is blown by the watchman as the signal for a general concentration on the factory of all hands on the estate. This business is one of the pretty sights of the day. My friend's estate at Matale, north of Kandy, the mountain capital, is situated in an amphitheatre of the big volcanic hills typical of the country. Down the slopes come winding the coolies and the women, picturesque with their baskets and scarlet cloths thrown loosely over one shoulder, engirthing the waist, and bunched up behind in the universal mode of the dress-improver. Now follows the last weighing of leaf; the workers stands in blocks, pruners here, roaders there, manurers yonder, while names are entered for the day's work in the register. The manager next goes his final round of the factory, returns to the bungalow, and then pays visits to his friends in the neighbourhood. Bridle-paths are fairly numerous on the estate, and cart roads connect one property with another. In his leisure time for sport he may get some snipe-shooting in December and January over the paddy fields or flat at the foot of the hills, in which is grown inferior rice called paddy. The coolies, too, are now free to go off to the coolie lines, where they live in their exiguous mansions, which they use merely as sleeping-places and as repositories for their scanty belongings. An

ordinary London room would house two dozen of them. Drinking and gambling are strictly forbidden, but both, and especially the latter, are too much for the coolie's powers of resistance, and when he retires to the lines he has long evenings of these ilicit enjoyments.

The best of the coolies are promoted for the plantations to the factory. The whole estate of some eight hundred acres is weeded by hand, and this tiresome work is done by the old women and children, the kangany having contracted to put the ground into a proper condition in this respect. The heavy draught work, of course, is done by oxen, which are branded on flank and back with most fantastic designs, a potent charm, according to the superstition of the natives, against rheumatism and other diseases of cattle. Rheumatism is prevalent because the tea plant has a strong predilection for a lightish clay soil, and rejoices if it finds a little disintegrated mica mixed therewith. Wages are paid monthly, but payment—in rupees—is always a month in arrear. This enables the manager to keep a firm hold over his men. Their feelings, however, are good towards their masters, who play the role of doctors and general mentors in all ordinary matters. An ordinary coolie makes his 33 cents a day, his kangany taking another 5 cents per diem for each coolie as head-pay. A woman is paid 25 and a boy 18 or 12 cents. The European has to deal with the Cinghalese, who are the natives; the Veddahs, who are the aborigines and of a dwarfish stature; and the Tamils, who are the immigrant Indians.

The importance of the Ceylon tea industry need be illustrated by one fact only. In the four years 1889-1893 the percentage of the sale of Ceylon tea as compared with that of India and China doubled itself, rising from 15 to 31 per cent. In the island an import duty is imposed on tea, so as to present possible malpractices connected with the export of foreign teas. The Ceylon Tea Fund is an advertising instrument for making Ceylon tea known all over the world, and is supported by subscriptions of 10 cents per 1,000 lb. of green tea-leaf plucked during each period of six months.—*Pall Mall Gazette*, Sept. 12.

MORE LIGHT ON QUININE.

More light has been shed on the quinine situation during the past week, and it now appears that natural distrust was the real cause of the sudden reductions in the price, the first of which occurred Aug. 17 and the second Aug. 24. With this distrust there was presented the difference between the cost of quinine and the selling price of the manufacturers, which was so wide as to afford possible temptation to some of the makers to quietly dispose of portions of their product at a price below that to which all had bound themselves to adhere. That some of the members of the combination have yielded to this temptation and made sales below the established quotation, and otherwise violated the understanding which has controlled the makers for the past two years, is more than suspected by others in the compact, as well as by the trade at large. Fresh goods have been imported from London within the past six months, and goods have been purchased, in this market within a shorter period from at least one of the manufacturers' agents for speculative account, a portion of which was afterward shipped to London. Furthermore, it is known beyond question that some of the members of the combination have been demanding as their allotment of sales a greater proportion of the whole than their generally understood relation to the consuming trade entitled them to, at least in the opinions of their competitors. It is a well known fact that one or more of the manufacturers overstepped the limits of the agreement, in a desire to sell goods, just before the advance of Dec. 18, 1895. Instead of confining sales to quantities sufficient for sixty days' requirements of their customers, beyond which they are bound not to contract to deliver, some of them persuaded the trade to contract for stocks far in excess of these limits. Whether the intent of this policy was to make a showing of sales which should secure a more liberal percentage in the next allotment, is, of course, not known to the outsiders. But the excessive contracts naturally resulted in heavy importations, and in course of time, when the large consumers realized that they had obligated themselves to take more than they could possibly consume within a reasonable length of time, they offered their surplus on the market at or about twenty-five cents per ounce, just what they had paid for it. This had a tendency to keep the market fairly well supplied, and to give the impression that the "outside" stock, which was supposed to be nearly exhausted, was like the widow's cruse. In spite of the condition of affairs which we have just pictured the demand for quinine had begun to increase when the first reduction in the price was ordered. It was, however, mostly from the jobbing trade throughout the country, rather than from the manufacturers of pills, many of whom were heavily stocked.

What the future has in store for the consumers of quinine no one knows to a certainty. The manufacturers may deem another reduction necessary to accomplish their purpose, which is to remove any possible temptation to some of their number to dispose of goods in violation of the compact. While the stability of the combination may have been threatened by the discoveries which have been made, there does not appear to be any likelihood of its dissolution, as the manufacturers know from bitter experience that their best interests are served by united action both in the purchasing of bark and in marketing the finished product. At the same time prudence dictates a more perfect relation of selling price to cost.

The bark is richer in alkaloid than it used to be, hence the cost of producing is lower than formerly. The bark shipments continue heavy, and at the August sale in Amsterdam, held on Thursday, 85 per cent. of the offerings, which were large, were purchased, but at a decline of 10 per cent. on the price paid at the July sale, which is conclusive evidence that the manufacturers still control the bark situation. A fact worthy of attention is that the price paid at Thursday's sale, two and fifty-five hundredths Dutch cents per unit of quinine was the lowest price ever known. In August, 1895, the sale realized two and six-tenths of a Dutch cent per unit, the lowest price up to that time, while in August, 1894, four and a half Dutch cents per unit was paid.

All that is now wanted on the part of the manufacturers to enable them to reach the goal they set out for two years ago is a little forbearance, coupled with some firmness, as the legitimate stock in second hands is not large.—*Oil Paint and Drug Reporter.*

THE UPPER MASKELIYA ESTATES COMPANY LIMITED.

Minutes of proceedings at the extraordinary general meeting of shareholders held at No. 7, Queen Street, Fort Colombo, on Saturday, 10th Oct. 1896:—

Present:—Mr. W. D. Gibbon, in the chair, and Mr. C. A. Leechman, Directors, and Messrs. G. H. Alston and James Forbes, Mr. C. J. Donald acting as Secretary. The following shareholders were represented by the holders of their Powers of Attorney:—Mr. A. E. Wright, Mrs. A. N. Wright, and Mr. Jas Gibb, by Mr. W. D. Gibbon and Mr. G. W. Carlyon and Mr. T. K. Wright, by Mr. G. H. Alston. Messrs. A. Thomson and W. H. G. Duncan were represented by proxy.

Mr. Gibbon having taken the chair, the notice convening the meeting was read.

The Chairman stated that the present meeting had been called to confirm the Special Resolution passed at the extraordinary general meeting on 5th September last. The special resolution was then proposed by the Chairman, seconded by Mr. James Forbes:—"That the share capital of the Company be and the same is hereby increased from R270,000 to R350,000 by the ereation of 160 shares of R500 each,"—which was carried.

A vote of thanks to the chair closed the proceedings

Correspondence.

To the Editor.

CEYLON TEA IN RUSSIA.

Nijni Novgorod, Moscow, Aug. 29.

DEAR SIR,—I went to see the big Fair yesterday—a truly wonderful sight, and the place crowded with people from all parts of the world. Mr. Rogivue is advertising Ceylon tea most successfully, and had had many orders from people—some for Siberia. He has well-advertised the teas of Ceylon, and the tea is selling well in Moscow. His tea place at the Fair is very attractive, and a splendid man in charge. We enjoyed Ceylon tea there made in Russian fashion very much and drank success to Ceylon.—Yours in haste, W. JORDAN.

THE BANDARAPOLA CEYLON COMPANY LIMITED.

16, Philpot Lane, London, E.C. 1st Sept. 1896.

SIR,—We beg to inform you that the Board of Directors of this Company have declared an Interim Dividend at the rate of 10 per cent per annum (free of Income Tax) for the half-year ending 30th June last.—Your obedient servants,

LYALL, ANDERSON & CO.,
Agents and Secretaries for Bandarapola Ceylon Company, Ltd.,

RHEA.

2, Victoria Mansions, Westminster, S.W.,
Sept. 11th 1896.

DEAR SIR,—I see that a great deal is being made of a report by a Mr. B. Ribbentrop Inspector-General of Forests for India, who states that "the difficulty of treating this fibre has at last been overcome by a Mr. Gomess."

Mr. Ribbentrop may be a very good Inspector of Forests, but as an authority on the treatment of Rhea Fibre, I do not think his opinion is worth much. He seems to be under the delusion that Mr. Gomess is the only person who can degum Rhea; as a matter of fact the Midlands Spinning Company have been employed degumming Rhea for the last two years at their factory at Long-Eaton in Derbyshire and spinning the product into yarns; which find a ready market; the process they are using is that of Mr. H. H. Boyle, whose Patents are our property.

It is one thing to treat Ramie as a Laboratory experiment, but quite another to do so on a commercial scale.

But before you can degum Ramie you have to decorticate the stems so as to remove the fibre—what then is the use of a degumming process unless you can decorticate? Mr. Ribbentrop appears to be ignorant of the fact that Mr. Gomess has no decorticator, how then he successfully treat the plant?

The £5,000 offered as a premium some time ago by the Government of India was for a decorticator and not for a degumming process; this premium was withdrawn because no machine entered for competition was equal to the Government's requirements.

Several decorticators have since been invented but so far as I know none have been successful; to be successful the machine must not only remove the wood but also the bark by the operation, this my machine does, and with labour at 6d per day I can produce a ton fibre equal to China grass at a cost of about *30s* per ton, this machine has been seen at work by Mr. J. O. B. Saunders of the *Calcutta Englishman*, and he was so impressed by its value that he communicated with the Indian Government with a view to having the offer of the £5,000 premium revived, but in the present state of finances they do not see their way to do so.

I wish Mr. Gomess and every other inventor of a process to degum the fibre every success; there is ample field for all but I do most certainly object to it being given to the world that Mr. Gomess is the first to solve this difficult problem.

I enclose you a report by textile experts as to my decorticator and Mr. Boyle's degumming process, these gentlemen are not inspectors of forests but they at least carry as much authority as experts on Rhea as Mr. Ribbentrop. These reports you are at liberty to print if you wish to do so.

It is self evident that a decorticator joined to an efficient degumming process renders the process complete, but one without the other is useless, if Ramie fibre is to be produced on a commercial scale and at such a price as to enable it to compete with existing fibres.—I am, dear sir, your obedient servant,

J. M. MACDONALD, Managing Director.

CEYLON TEA IN AMERICA.

SIR,—Will you allow me once more to ask for your good offices in the interests of the tea trade with America.

Mr. Mackenzie writes the results of his interviews with the principal tea houses during his late trip to the States.

He says that the dealers "deprecate our packing more than four kinds of tea for America, and they mentioned the following prices:—15 cents (7½d), 20 cents (10d), 30 cents (1s 3d), 40 cents (1s 8d). They would not taste or handle teas running up by single cents per lb.; but thought these prices most suitable for long lines of tea. Life is too short, is the general comment on the English market, with a thousand samples to be tasted weekly."

One firm had "taken up those teas with misgivings and hesitation, but had now great faith."

From London I also hear complaints of the "small breaks, and innumerable samples for London trade as well as for America. It is thought that Ceylon will have to suit its teas to what is the universal demand, or lose ground."

The same firm adds "the number of small lots now offering is very confusing to buyers, and tends to lower the average, and it is difficult to get a continuous supply of teas of average quality. With these expressions of opinion from our best friends, it is surely impolitic on our part not to try and meet the views of the market.—I am, &c.,

Sept. 16th. A. W. S. SACKVILLE.

INSECT ENEMIES OF TEA.

Dartry, Gampola, Sept. 17.

DEAR SIR,—I send you in a match-box some poochies I found this morning on a patch of tea, the leaves of which had been completely eaten up by this insect.

If you can tell me the name of the insect and if it is likely to become a scourge, it would be interesting.—Yours faithfully,

J. A. ROBERTS.

[Mr. Staniforth Green, to whom we referred the insects and leaves, writes:—

"The tea leaves sent to me by Mr. Roberts of Dartry estate have been attacked by the same case-bearing caterpillar as the one described in last night's 'Times of Ceylon,' under the head of 'Tea Bushes and Caterpillars." With his tea leaves Mr. Roberts has sent some small dipterous flies, bearing some

resemblance to the common house-fly, but much smaller, being about a quarter of an inch in length These flies come from the eggs deposited by the parent fly under the skin of the caterpillar, and they have undergone all their changes, from the egg to the perfect states, within the caterpillars ease, to the complete destruction of their host. It would be interesting to know how the parent fly, with its soft ovipositor, is able to lodge an egg with success under the skin of the caterpillar. Perhaps it is effected while the caterpillar has its head and shoulders out of its tough case when on the move, or in feeding. There is also an ichneumon-fly that destroys the caterpillar, but being armed with a strong sting-like ovipositor, it would probably, in urging its egg, be able to pierce the tough case. No living caterpillar was discoverable among those sent by Mr. Roberts. All had miserably perished, so that it is to be hoped they will be kept well under through the attacks of their insect enemies, and that the tea tree will never be seriously damaged by them. The fly lays a single egg under or upon the skin of its victim.—Colombo, 2nd Oct."—Ed. *T.A.*]

SCOTTISH CEYLON TEA COMPANY LIMITED.

16, Philpot Lane, London, Sept 19.

Sir,—We beg to inform you that the Board of Directors of this Company have declared an *Interim* Dividend at the rate of 10 per cent. per annum (free of Income Tax) for the half year ending 30th June last, on the body shares.

Your obedient servants,
LYALL, ANDERSON & CO.
Agents & Secretaries.

EDERAPOLLA TEA COMPANY OF CEYLON, LIMITED.

16, Philpot Lane, London, Sept. 22.

Sir,—We beg to inform you that the Board of Directors of this Company have declared an *interim* dividend at the rate of 10 per cent per annum (free of Income Tax) for the half-year ending 30th June last.—Your Obedient Servants,

LYALL ANDERSON & CO.
Agents & Secretaries.

SILK CULTIVATION IN CEYLON.

We-uda, Oct. 10th.

Dear Sir,—Those of your readers who are interested in Sericulture will be glad to learn that the opinion expressed in my letter of 25th July, with regard to the Bengal silkworms, has proved correct: worms recently reared in Dimbula have produced finer cocoons than in the low-country and without any falling-off as regards their brilliance, the special characteristic of Bengal silk. It remains to be seen what diminution in the number of broods in a year is caused by the colder climate, but even if the reduction is considerable, it will, I think, be fully compensated for by the increased weight of the cocoons.

I hope soon to be able to distribute eggs or young worms of the finest varieties of the annual silkworm from Japan. My stock of mulberry trees is limited, and is required for several species, and it is desirable to ascertain by actual experiment at what elevation the annual worms will give the best result. With this object in view I shall be glad to hear from anyone, in any district over 500 feet elevation, who is willing to make a trial with this species.—Yours faithfully, PERCY N. BRAINE.

THE NICARAGUAN RUBBER DECREE.

A decree of the government of Nicaragua, restricting the exportation of India-rubber to the produce of cultivated trees, has been translated for the United States department of state by Vice-Consul Henry E. Low, at Managua, as follows:—

To prevent the extinction of the India-rubber trees in the national forests, and to develop their cultivation in plantations, arranged with the bounty laws, the president of the republic decrees:

1. From January 1, 1897, it will be prohibited in all parts of the republic to export India-rubber which has not been cultivated in plantations, arranged in accordance to the laws of March 6, 1883, and March 23, 1887.

2. The foregoing prohibition will last for ten years from the date indicated, and whosoever shall act contrary shall be fined in accordance with the regulations concerning fraud upon the treasury, shall lose for the benefit of the treasury the India-rubber, and besides be fined to the amount of *four times its value.*

3. India-rubber can be exported only coming from regular plantations, formed, as before said, in conformity to the bounty laws of 1883 and 1887, but to verify it the exporters must register their rubber forms, first, in the office of the tax-collector of the district, expressing the number and age of trees. This registration will be gratuitous and must be made every year in the first days of January, to produce the desired effect. The exporters must receive from the tax-collector way bill (a certificte on, and to go with the produce forwarded) made out to order; in order that this document may be endorsed, they must present their registration certificate, and forward a copy of both documents to the minister of finance.

4. Anybody found extracting India-rubber from the national forests will be considered as a smuggler (contrabandist) and will be sentenced and fined as such by authority of the judicial or police department

5. To be presented in the next sitting of the legislature, to be published.

Interviews with Mr. William A. De Long, who was for some years engaged in the India-rubber trade in Nicaragua, and with other rubber-men in New York, have elicited only expressions of the opinion that the enforcement of the above decree will be practically impossible. In some quarters it has been intimated that the government of Nicaragua can ill afford to lose the revenue derived hitherto from the export duty on India-rubber, amounting to 4 cents a pound, or about $40,000 a year.—*Indiarubber and Guttapercha, Journal*, Sept. 10.

THE AMSTERDAM DRUG-MARKET.

Our Amsterdam correspondent reports that the public auctions to be held on October 1st., will include 5,128 bales and 237 cases, weighing together 498,539 kilos, of Java cinchona bark. The total quantity of sulphate of quinine represented is 28,616 kilos., giving an average of 5·83 per cent for the Manufacturing bark. The supply includes 14,288 kilos of Druggists' bark, with 402 kilos of sulphate of quinine.—*Chemist and Druggist*, Sept. 26.

STRANGE STATEMENTS RESPECTING QUININE.

It must be confessed that the current explanations of the motives of the quinine manufacturers' combination in reducing their official price, by two strokes delivered in quick succession, to 11½d per oz. are by no means satisfactory. We referred, in our issue of last week, to the talk of change and the Commercial Sale Rooms; but it is difficult to see how anyone could be so foolhardy as to select the present moment for opening a new quinine works on the Continent, while the notion that the manufacturers' action was inspired by fear of coming competition from the new quinine factory in Java may also be dismissed as improbable. The Java quinine-works will be, at best, a very small factor in the quinine-market for some years to come, and to reduce the price in Europe by nearly 20 per cent before a single ounce of Java-made quinine has yet made its appearance in the open market would be as preposterous as, say, the raising of fortifications round London because of a diplomatic rupture with Venezuela. Another reason, not mentioned by us last week, which has been put forward to account for the action of the combined makers is the competition of the Imperial Quinine-works in London, which are not in the "ring." With all respect to that excellent and now well-established factory, however, we cannot affect to regard it, at present, as a sufficiently serious competitor to the older makers to call for such drastic action on their part as a twopenny-halfpenny reduction on a fourteenpenny article. Moreover, though the Imperial Quinine-works are said, by their selling-agents to have sufficient quinine orders on hand to keep them going for several months, they have never adopted an aggressive "cutting" policy towards the older makers. In fact, they have not even replied to the two reductions announced by the manufacturers' "ring" by lowering their own price.

So much for the current talk concerning the reasons that have inspired the action of the quinine-makers. Now let us inquire whether there are no other motives that may have inspired so serious a step as that of deliberate depreciation of their own stock of quinine by nearly 20 per cent., at a time when nothing but the manufacturers' own initiative could have caused such a depreciation.

It would naturally be expected that the London Agents of the German quinine makers would be the persons most likely to be able to afford information on the policy of their principals. Nothing of the kind. One and all these gentlemen profess to know rather less about that policy than the merest outsider. Their instructions come to them cut and dried, "made, in Germany" without a word of explanation. Thus, child-like and bland, they face their customers, "Story? bless you, Sir, I have none to tell," is the burden of their song. Yet it is an open secret that the policy which led to the establishment of the "concert of quinine-makers" had its mainspring in Germany, and that the directing wires are still pulled from that country. That those who dictate the policy of the "ring" know what they are about is shown by the results of the combination. During its existence the stock of quinine in the London warehouses, in other words, the only large aggregation of second-hand supplies in the world, has been reduced from 3,027,718 oz. (on August 31, 1894) to its present small compass of 1,675,600 oz. The stock of cinchona bark in London has been similarly reduced, all sources of supply, except Java, have practically run dry, and the quinine-makers can buy their raw material at auction in Amsterdam and London at a figure out of all proportion low compared with the recent selling price of quinine.

Only one thing has been wanting to render the market-supremacy of the "ring" complete, viz.—regulation of the supply of bark. That has failed them hitherto. There are reasons for believing that, although at first sight an abundant supply of cheap raw material must be to the manufacturers' advantage, they would have been quite as well pleased if Java had lived up to the expectations generally entertained of her, by gradually diminishing her output. The makers have been confronted month after month with unmanageably large supplies offered, practically without reserve, at the Amsterdam auctions. There are only some half-dozen customers for these supplies, and they have been gorged to their throats. Said one of the largest German quinine-makers last summer to the present writer, whom he showed over his factory, which was then shut down in order not to heap up unnecessary quinine supplies: "We have told the Java gentlemen that we cannot swallow their stuff at the present rate, and still they keep sending more. We have now threatened them that if they do not bring their output in harmony with the requirements, we shall let the unit at the Amsterdam auctions drop to a figure that will bring them to their senses." But the Java planters are a promiscuous mob. They have shown themselves incapable of intelligent co-operation, and they now suffer for their short-comings. Which brings us to our next point—viz., the question why other, and more business-like persons, should not accomplish what the planters have failed to do? The cinchona exports from Java still keep increasing month by month. For the year ending the 30th June, 1896, the total was 9,108,385 half-kilos, as compared with 8,705,057 and 7,428,336 in the two preceding seasons. Moreover, we hear today, from our Amsterdam correspondent, that the August shipments, of which the results was made known in Amsterdam on Wednesday, show a still greater relative increase, the figures being as follows:—

	1896	1895	1894	1893
Aug. Half-kilos ...	979,300	697,000	853,000	636,000
January 1 to Aug. 30th	6,029,000	5,013,000	5,554,000	5,376,000

All expectations of an improvement in the price of bark based upon the diminished exports are therefore at an end for the present. It is said that the heavy shipments of the last few months are due to the unusual character of the monsoon, and that there will be such a falling off during the remainder of the year that 1895 will ultimately take rank as the highest season on record. This, however, is a statement that has been made many times before, and it is difficult to credit it now.

On the other hand, we hear from a well-informed source that the recent reduction in the quinine-price was a deliberate move in the policy of the combined quinine-makers. It is known that sometime ago an expert, on behalf of the Syndicate of quinine-makers and a few others closely connected with the trade, visited all the Java plantations, and prepared an exhaustive report of their capacity. It is supposed that a scheme was subsequently drawn up, and discussed between the quinine Syndicate and the proprietors of the principal plantations in Java, under which the Syndicate undertook

to buy out the plantation owners—lock, stock, and barrel. The negotiations, it is added, reached a point at which it seemed almost certain that at least three-quarters of the Java, plantations, including all those of real importance, were about to pass under the control of the Syndicate. At that time, it may be noted, the current price of Java-bark in Amsterdam was about 2·80c per unit per half kilo. At the last moment, however, negotiations fell through. Now it is hinted that the sudden reduction in the price of quinine which followed the breaking-off of the negotiations is due to a definite policy on the part of the quinine Syndicate to depriciate the bark-market to such an extent that the plantation-owners will be forced to come to terms. The first result of the move was seen at last Thursday's Amsterdam auctions, when the unit fell to 2·55c., the lowest point touched since February, 1895, when the lowest unit on record, viz., 2·50c. was reached. If the quinine manufacturers' policy should be successful, we shall probably see a further fall in the unit at the September auctions in Amsterdam, and it may be well that shortly afterwards the formation of a Syndicate to take over the bulk of the Java plantations will be announced. Such a step would give to the quinine-makers almost a few years' monopoly of the market, inasmuch as Ceylon has but little bark left, while the Indian supply is small and partly of poor quality, and neither cultivated nor wild-growing (Cuprea) barks from South America can be thrown upon the European market in quantities large enough to affect the quinine-supply at anything like the present unit.

We repeat that this statement comes to us from a well-informed source, but we cannot, of course, guarantee even the partial truth of the assertions. Yet there is nothing inherently improbable about them. Several unsuccessful attempts have previously been made to bring the cinchona supply under control, but none of these were set on foot by an organisation so powerful as the present quinine combination; and it is well known that some of the members of the combination, especially in Germany, have long been anxious to place their business upon a sounder footing. So much is certain, that if the quinine-makers should obtain control of the bulk of the plantations, they will be able to raise their prices to an extent that will richly compensate them for the recent decline.—*Chemist and Druggist.*

PLANTING AND PRODUCE.

India and its Produce.—The recently issued volume by the Government of India of British India for the years 1894-95 consists mainly of elaborate tables, with an explanatory memorandum prefixed. The tables show the tea, coffee, and cinchona cultivation in each district of each province and in the native states in 1893 and 1894, and the progress in each product from 1895 to 1894. In 1893 the total area under tea in India was 395,830¼ acres; and in 1894 it had increased to 422,551 acres. The highest average yield per acre from mature plants was obtained in Jalpaiguri, viz., 555·9lb in 1893, and 541·3lb in 1894. The total acreage under coffee in India in 1893 was 258,984·11 acres, and in 1894 it was 277,881·94 acres. In 1893-94 there were 11,235 acres under chinchona in India; but in 1894-95 the acreage had decreased to 8,710. A copy of the annual report of the Secretary to the Chief Commissioner in Assam on the subject of tea culture in that state for 1895 has recently been received at the Board of Trade from the India Office. As in previous years, in the statement appended to this report, figures are given for each subdivision separately, in addition to the totals for each district. Silchar continues to head the list in regard to the number of tea gardens and the area under tea cultivation and the Dibrugarh subdivision still shows the largest outturn. The total number of gardens at the close of 1895 was 812, against 823 in 1894, showing a decrease of 11 gardens. During the year 15 gardens were newly opened, against 48 in the previous year, 17 were closed against 7 in 1894, and 9 gardens were amalgamated with other gardens against 10 in 1894. Some improvement has taken place in the number of gardens furnishing statistics. Out of 812 gardens, statistics have been furnished in respect of 717 gardens, against 698 in the preceding year: estimates had to be framed for 95 gardens, against 125 in 1894. The Chief Commissioner's thanks are due to those managers and agents, who have furnished the required information. The total increase of 7,218 acres under tea cultivation, as compared with 12,171 acres in 1894 is distributed among all districts except Cachar and Darrang. In Cachar it is stated that new extensions have not kept pace with the areas of old tea abandoned, and in Darrang the decrease is said to be more apparent than real, being due to greater accuracy in the figures for certain gardens for which estimates had to be framed in previous years. The total outturn of tea during the year was 99,524,584lb, as against 94,829,059lb, in 1894, or an increase of 4,695,515lb.

How the China Tea Trade is Handicapped.—It is not only that China tea shippers have to meet the successfull competition of India and Ceylon teas, but the Chinese Government have helped to destroy the trade, the decay of which they now lament. If the Chinese authorities would abolish duty and admit machinery, the tea trade of China would be permitted a chance of recovering some of its lost ground, but that is not a matter that the planters of India and Ceylon wish to see altered. The perversity of the Chinese officials has no doubt helped to benefit British-grown tea. On the subject of likin the British consul at Fuchau recently wrote: "Even in China the imposition of likin occasionally leads to riots. The likin duty on tea is nominally 2·20 taels per picul but additions bring it up to nearly 2·80 taels. The tax, for reasons known to the officials, is divided into five items called original dues, likin dues, expense of collection, military contribution, and 'loss on touch of silver,' all of which vary in amount. To these have to be added a ferry toll or duty on all teas from the north, and a tax of 3c 'for benevolent purposes' on teas coming from the districts to the west, and one or two extra tolls, so that the total amount does not fall short of 2·80 taels. If the value of tea is taken at 15 taels per picul, with the export duty it has to bear taxation to the amount of 5·30 taels, or about 35 per cent. *ad valorem*, before it leaves China. It may be asked why transit passes are not taken out, which would enable the merchant to bring the tea to the port on a payment of 1·25 taels per picul. The native dealers and growers are afraid of official opposition, and European exporters find it impossible to make the necessary arrangements. (1) The Lo Ti Shui or Octroi office—This has seven branches which collect annually 30,000 or 40,000 taels on goods taken into Fuchau by road. Like the likin it is under the control of the provincial treasurer."

Planting Enterprise in East Africa.—There is every reason to believe that the Shiré Highlands will become the seat of an important planting industry. Shiré Highland coffee commands a high price on the London market. At Zanzibar, Sir John Kirk's experimental garden is an object of interest, although the trials of tea do not appear to be satisfactory. An account of the present condition of the garden is contained in the following notes of a recent visit, taken from the *Zanzibar Gazette* of August 28, 1894: "Mr. Crabbe, the Ceylon planter who was passing through here last week on his way to Nyassaland,

paid a special visit to Mbweni for the purpose of noting the condition of the coffee plantations started by Sir John Kirk at the close of his time here. Mr. Crabbe was well pleased with the condition of many of tho trees, and as the crop was ripe and falling, he opened some berries and considered some of the beans quite fine. He made several recommendations which were duly transmitted to the Rev. J. Key, who takes great interest in the plantation, but who was unfortunately away from home at the time. The tea, which is now in full blossom and affords a pretty sight, well worth a drive to visit, Mr. Crabbe considered a poor kind and for the leaf hardly worth growing, and he did not recommend its extension The caoao, he considered planted in too windy a site, but walking about the shamba pointed out many spots on which he thought it could be planted to better advantage."

A New Use for the Wild Tamarind Plant.—In the botanical section of the British Association, Mr. D. Morris, assistant director of the Royal Gardens, Kew, contributed a paper, which in his absence was read by Mr. Seward, on "The Singular Effect Produced on Certain Animals in the West Indies by Feeding on the Young Shoots, Leaves, Pods, and Seeds of the Wild Tamarind or Jumbai Plant (*Leucœna glauca*, Benth.)" The properties of this plant had received little or no attention in this country. It is commonly found along roadsides and in waste places in tropical America. The plant was much more plentiful in the Bahamas than in Jamaica; it was, in fact, distinctly encouraged in the former islands as a fodder plant. The people were fully aware of the singular effect it produced on horses, causing them to lose the hair from their manes and tails. It also affected mules and donkeys. Its effect on pigs was still more marked. These animals assumed a completely naked condition, and appeared without a single hair on their body. Horses badly affected by jumbai were occasionally seen in the streets of Nassau, where they were known as "cigar-tails." Such dilapidated animals, although apparently healthy, were considerably depreciated in value. They were said to recover when fed exclusively on corn and grass. The new hair was, however, of a different colour and texture, "so the animals were never quite the same." One animal was cited as having lost its hoofs as well, and in consequence it had to be kept in slings until they grew again and hardened. The effects of the jumbai on horses, mules, donkeys, and pigs were regarded as accidental—due to neglect or ignorance. The plant was really encouraged to supply food for cattle, sheep, and goats. The latter greedily devoured it, and were not perceptibly affected by it. It would be noticed that the animals affected were non-ruminants, while those not affected were ruminants. The probable explanation was that the ruminants, by thoroughly mixing the food saliva and slowly digesting it, were enabled to neutralise the action of the poison and escape injury. The seeds probably contained the deleterious principal in a greater degree than any other part of the plant. The effect upon mankind is not stated, but, if it be at all analogous to that upon pigs, the plant should come into use as a homeœopathic remedy for baldness.

Operations in "Futures."—In certain quarters gambling in futures" has been seized upon as the disturbing new condition of the produce market. It is, however, a suggestive fact that dealings in "futures" originated in a period of abnormal disturbance in prices consequent on the outbreak of tho American Civil War. At the outset, at least, transactions of this nature were simply methods of insurance; the planter in raising his crop was glad of an opportunity of approximately securing beforehand an adequate return for his outlay, and the user of raw materials was equally pleased to have a means of securing ahead a supply of material at a price fairly proportionate to that at which he could contract for the sale of the fabrics. In more recent years this system has extended to the distributer, who, having had to face incalculable variations of exchange, has also insured himself by what are practically operations in exchange "futures." In the Economic Section of the British Association on Monday, Mr. Elijah Helm, Secretary of the Manchester Chamber of Commerce, read a paper on "Mercantile Markets for Futures." He described the origin and purpose of dealings in futures. It constituted, he said, a method of insurance to producers and distributers against the risks of fluctuating prices, for the system had accentuated the fall of prices, of commodities within the last twenty years. Its development had been assisted by the telegraph and the telephone. It could be differentiated from pure gambling. He maintained that the system properly organised and controlled, was, on the whole, economically beneficial, and that the demand for its legislative suppression was not justified. Mr. Charles Stewart, who followed with a paper on cotton futures, described what they were and how they operated in practice. Cotton futures were, he said, "hedges," first as sales, second as purchases. The system of dealing in futures was the natural outcome of the expansion of trade, particularly the future of tho development of such by telegraph. Tho increase in the size of the crops, the small margin of present-day profits, the greater speed in transit, the increased magnitude of producing concerns, and the necessarily greater increase in capital for their requirements, were all demonstrated in the explanations given of the practice. In the course of the discussion it was pointed out that, but for the system described, planters would run serious risks, as they used to do in old times, when every producer sent his cotton to the market at the same time, and so depressed prices; whereas now a planter could sell his cotton whilst the crop was growing.

The Dock Companies and Shipowners.—The circular issued by the London and India Docks Joint Committee with reference to the arrangement for discharging cargoes on the quays for shipowners, who desire to retain their fixed berths proposes the following terms:—(1) That the shipowners pay to the Joint Committee a sum of six pence per ton weight on all goods discharged within the docks, except those upon which the Joint Committee receive landing charges, and also excluding bulk grain. (2) That the shipowners deliver goods entered for overside delivery, free to the Joint Committee's craft—*i. e.*, on the samo terms as to other consignees' craft. (3) With the above alterations, the terms of the existing agreements and arrangements to remain unaltered. In the event of these terms being generally accepted, the committee purpose issuing a revised scale of rates for the use of their dry docks at about 10 per cent. below that now in force. Fixed berths, it is added, will be available on similar terms at the Tilbury Docks, as well as at the Victoria and Albert Docks, and to a limited extent and the West India Dock. The charges are calculated on the ton of 2,240 lb weight. In view of the fact, that neogtiations are proceeding, the date on which existing agreements and arrangements termintate has been postponed until November 1.

INDIAN PATENTS.

Applications in respect of the undermentioned inventions have been field, during the week, ending, 26th September 1896, under the provisions of Act, V of 1888.

For improvements in machines for breaking balls of rolled tea leaf and sifting the same.—No. 333 of 1896. —Nathan William Horatio Sharpe, engineer, of 26, Perth road, Stroud green, London, for improvements in machinos for breaking balls of rolled tea leaf and sifting the same.

For an invention to be called "Quinlivan's simple and unique machine for hulling paddy into clean or cargo rice by steam, cattle or hand power."—No. 4. of 1896.—Thomas Quinlivan, engineer and miller, residing in the city of Rangoon, of the province of Burma, for an invention to be called "Quinlivan's simple and unique machine for hulling paddy into clean or cargo rice by steam, cattle or hand power." Specification filed 29th July 1896.

COFFEE PLANTING IN BRITISH CENTRAL AFRICA.

(*Appendix No. 2 to Sir H. Johnston's Report.*)

In 1878 a Mr. Jonathan Duncan was appointed by the Church of Scotland Foreign Mission Committee to join the Mission in what is now British Central Africa as a lay member and horticulturist. Before leaving Edinburgh the present Curator of the Botanical Gardens there gave him three small coffee plants, which he took out with him and planted in the Mission gardens at Blantyre. Prior to this, in 1876, the late Mr. John Buchanan, C.M.G., had joined the same Mission at Blantyre as a lay member, especially in charge of horticultural work. Mr. Buchanan took a special interest in the cultivation of coffee. In the year 1880, the sole survivor of the three plants brought out by Mr. Duncan bore a crop of about 1,000 beans, which were all planted, and from which 400 seedlings were eventually reared in the Blantyre Mission gardens. "In 1883*, from the 400 trees 14½ cwts. of coffee was gathered. The size of the pits in which the trees were planted were 6 feet wide by 3 feet deep. They were filled up with alluvial soil, cow manure, and wood ashes. I believe this accounts for the enormous crop."

In 1879 Mr. Henry Henderson, a well-known lay member of the Church of Scotland Mission, now dead, who founded the Blantyre Station—who may be said, in fact, to have founded Blantyre, since the selection and purchase of the site was his own doing—brought out with him 56 lbs. of Liberian coffee seed, but the introduction of this variety met with but scant success, and although there are still some survivors traceable to this introduction, it has been found far more profitable to plant the small Mocha coffee which was the kind originally introduced through the medium of the Botanical Gardens at Edinburgh. Later on, varieties of Jamaica coffee were introduced by the Moir Brothers, whilst managers of the African Lakes Company, Mandala. The blue mountain variety thus introduced has succeeded very well in the Shire Highlands, and to a less extent the orange coffee has prospered.

In 1878 Mr. John Buchanan planted some coffee for the Church of Scotland Mission at Zomba, on the Mlungusi stream, close to the present site of the Residency. In 1880 Mr. Buchanan has left the service of the Mission, for whom he had worked four years, and started with first one and then two of his brothers as coffee planters. It was a plucky enterprise, as they had practically no capital, and but for the generosity with which they were helped and supported by Dr. Rankin (their parish minister at Muthill, in Perthshire) they would probably have broken down for want of funds. After Mr. Buchanan left the service of the Mission, nothing further was done by that body as regards coffee planting other than to keep in good order the parent trees, one or two of which are said to be still growing in the Mission grounds at Blantyre. For nearly ten years (1880 to 1890) Mr. Buchanan and his bothers were the only coffee planters in Nyasaland. In my Report on the first three years' administration of this Protectorate I somewhat erroneously gave Mr. Buchanan's name as that of the original introducer of coffee into British Central Africa. This was not quite correct, though it was not wholly incorrect. Mr. John Buchanan arrived in this country two years before Mr. Duncan, and it was on account of his energetic representations to his friends in Scotland interested in botanical work that the Curator of the Edinburgh Botanical Gardens intrusted these three coffee plants to Mr. Jonatham Duncan to convey to Blantyre. This coupled with the long ten years' work as the sole coffee planter in what is now the British Central Africa Protectorate, may fairly entitle Mr. Buchanan to be considered the introducer of coffee culture into British Central Africa, a more potent factor of civilisation, perhaps, than any other form of commerce or enterprise, and far more wholesome than the feverish rush for minerals. In 1884 Mr. Buchanan returned to Scotland, and wrote an interesting book on his attempts to create coffee plantations in the Shire Highlands.*

In 1886 and 1887 the Buchanan Brothers were much encouraged and helped by Mr. Consul Hawes,† who, finding their finances at a low ebb, and struck with their eagerness to turn their abilities to account, employed them to build the Residency at Zomba, which is still the best and largest—and perhaps, one may add, the most durable—building erected up to the present time in Central Africa, north of the Zambezi and south of the Congo. The Government grounds at Zomba are a portion of Mr. Buchanan's original coffee estate, and were sold by him to the Government for a nominal sum. In 1888 Mr. Buchanan became Acting Consul, and when the Administration of the Protectorate was started in 1891, he received the appointment of Vice-Consul at Blantyre, which he held up to the time of his death. His services in regard to this country were early recognised by Her Majesty's Government, and he received a C.M.G. in 1890. At the time of his death, which took place on the 9th March, 1896, as he was on his way home for a long holiday, he was still by far the most considerable coffee planter in British Central Africa.

At the close of 1889 Mr. Eugene Sharrer arrived in this country to start coffee planting. Mr. Sharrer had previously visited the Shire Highlands before Consul Hawes' return to England in 1889, and had been assisted by the latter to acquire some estates in the Zomba district, and encouraged to start coffee planting. Then ensued the declaration of the British Protectorate and the immigration of British and other European planters became so general as, in the course of a few years, to increase the number of planters in the Shire Province alone to something like 100. Coffee planting was now established as the chief industry of Nyasaland, and undoubtedly it is almost wholly coffee planting which has brought about such a prosperous change in this part of Africa, and has enabled our local revenue to rise from nothing to 20,000*l.* per annum in five years.

Out of the approximate 100 which forms about the present total of the planters, 12 are Europeans of other than British nationality, and consist of 4 Dutchmen, 3 Germans, 1 Frenchman, 1 Italian, 2 Austrian Poles, and 1 Portuguese (recently established in Mlanje.)

Besides these European planters, it is pleasant to be able to record that six natives who have risen, most of them from the position of scholars at the Mission schools, have started and are doing well as coffee planters. One of these men is a native Chief, who surrendered his governing rights to the British Government, and has gone in vigorously for coffee planting. The other natives are George Chokobwino, "David Livingstone," Tom and Sam Makwito (these two were educated at the Lovedale Institute, South Africa), and Donald Malota. In addition to these, I may mention the Chief Mbaruku, the senior member of the native Council at Kotakota, on Lake Nyasa (a Muhammadan), who has shown himself intensely interested in all these questions of planting and stock-breeding, and who has started coffee planting on a small scale in the Marimba district. The Church of Scotland Mission, which was the pioneer in the introduction of coffee, but which until quite recently never went in for coffee planting, has now started a small estate worked by its scholars.

The Zambezi Industrial Mission makes coffee planting its principal industry, and hopes in time to become self-supporting from the proceeds of its plantations.

The African Lakes Corporation, though mainly a trading Company, have some flourishing coffee plantations.

Coffee planting is at present almost entirely confined to the Shire Province, and, indeed, to the much more

* I quote from an article on the subject written by Mr. Jonathan Duncan, now a coffee planter in Central Africa, to a local newspaper published at Zomba, the "Central African Planter."

* "The Shire Highlands," published by Blackwood.

† Now Her Magesty's Commissioner and Consul-Gener in Hawaii.

restricted area of the Shiré Highlands. A little is done in Angoniland (Upper Shiré and South Nyasa districts), and a very little in the Marimba district. Coffee planting has also been started by the Livingstonia Mission in the North Nyasa district, but at present without any results to be chronicled.

Messrs. Buchanan Brothers have under cultivation about 900 acres of coffee on their various plantations, situated between Zomba on the north and the River Ruo on the south. They have in their employ nine Europeans in various capacities looking after the coffee. They expect to export this year nearly 100 tons.

Mr. E. C. A. Sharrer is the largest owner of estates in all the Protectorate, as is shown by the accompanying map. These amount to an approximate 365,000 acres, of which only about 900 are at present under cultivation with coffee. He employs about nineteen European assistants to look after these estates, and cotton is grown as well as coffee. His plantations being very much younger than those of Buchanan Brothers, his export is comparatively little at present, but I believe he will send home about 20 to 30 tons of the present year's crop.

Mr. Hugh Bloomfield Bradshaw formerly an officer in a cavalry regiment, has some large estates in the Mlanje district. His approximate area under cultivation is 300 acres, and he expects to export about 20 tons of coffee this year.

Messrs. Petitt Brothers, who came out originally to hunt, took to planting coffee four years ago. They own about 50,000 acres, of which about 300 acres are planted out. Their out-turn this year is expected to reach 20 tons. They employ five European assistants.

Mr. John W. Moir, for many years joint manager of the African Lakes Company, has about 230 acres planted with coffee in the Mlanje district and will probably export a little over 10 tons in the course of the present year. Mr. Moir employs three European assistants.

Mr. Henry Brown also formerly in the service of the African Lakes Company, a planter on Mlanje, will export about 10 tons this year.

Mr. Kasimir Stebleeki, an Austrian Pole, has about 200 acres under cultivation, and may export as much this year as 12 tons.

So far as I am aware, no other planter expects his year's output to reach 10 tons, as the other plantations are scarcely old enough to bear more than "maiden" crops. The total export of coffee anticipated during the year 1896 is expected to reach a total of 350 tons.

It is worthy of note that a great interest has been taken lately by Ceylon planters in the prospects of successful coffee cultivation in British Central Africa. There is one Company already established in Ceylon, the Nyasaland Coffee Company, which has acquired valuable estates in the Mlanje district, and is placing a large area under cultivation. I believe, in addition, one or two Englishmen have come here from Ceylon, and are starting coffee planting on their own account.

The ordinary procedure of an average planter on coming into this country is to start planting in the following manner:—

After selecting and purchasing his land, he begins by obtaining labour (this should be about the month of June; it is advisable to commence at that season of the year), and cuts down all the superfluous timber on the land he wishes to plant, and uproots the bush which, together with the timber, he carefully burns and mixes the ashes with the soil. The further clearing of grass &c., is effected by hoeing. The ground is now lined out in regular rows from 6 feet to 7 feet apart, and at equal intervals of not less than 6 feet or 7 feet, pits are dug in these lines with a common hoe, 18 inches wide and 18 inches deep. These pits then are left open for as long as possible (say until September) to "weather," then they are filled up and a bamboo stuck in the centre to mark the place where the coffee plant is to be inserted. Prior to this the planter will either have made a nursery for himself, rearing the young plants from seed, or will have made an arrangement with some neighbouring planter to purchase seedlings already grown. When the rains begin about the latter end of November, he proceeds to plant out the seedlings in the aforesaid pits, taking care that sufficient labour is available at this time of year to keep all the land which he is cultivating free from grass and weeds. The majority of planters up to the present time have contented themselves with erecting a wattle and daub-house with a thatched roof, not caring to build a more substantial or sanitary dwelling until they are sure of some return from their coffee. But the older planters have already built for themselves good substantial brick houses, and some of the newer men, realizing how important it is to health, start house-building at the very commencement on substantial lines. I consider mud houses of one storey and thatched roofs unsanitary. The house is generally damp, as the floor is simply on the ground, and the thatched roof rots with the wet, and the rotting grass seems actually to be the cause of certain forms of sickness. The best kind of house which could be put up rapidly and with little expense would be with corrugated iron (roof and sides), having a timber lining to moderate the great heat coming from the iron during the day-time. Undoubtedly the best kind of house for this climate is one of brick with a corrugated iron roof and timber ceilings. The average amount of ground which a man is able to open up who has at his command sufficient capital to employ 100 men is about 60 or 70 acres of coffee a-year. This would come into bearing with what is called the "maiden crop" after three years.

The estimated total expense of the planting, upkeep, and bringing into bearing of (say) 100 acres, together with the cost of the planter's living in a reasonably comfortable style, should not amount to more than 1,000*l*. This, however, would not cover the expense of erecting a brick house, brick pulping vats, and importing machinery for pulping. If, after the first year, the planter is not desirous of increasing the area under cultivation, and merely contents himself with keeping the plantation clear of weeds, draining it and making roads through it, he should be very well to keep within the above mentioned expenditure of 1,000*l*. until his coffee brings him some return. The third year, generally about the end of June, the crop is ready for picking. This is, of course, one of the busiest times for the planter. The care which is necessary for the proper pulping, and more especially for the preparing of the coffee for shipment, entails considerable trouble in this country, because even during the dry season we are apt to be surprised with occasional showers of rain. Perhaps the best time for shipping coffee from this country is at the end of the very dry month of October.

As regards pulping: The usual process adopted in this country is similar to that in vogue elsewhere. The berry when picked (it is here spoken of as the "cherry") is passed through a pulper, all of which in this Protectorate, with one exception, are worked by hand power. The beans are here separated from the sweet, fleshy envelope which covers them, and are passed into a brick vat where they are left (according to the temperature) for twenty-four to thirty-six hours for fermentation. They are then passed on to a second vat, thoroughly washed, taken out and dried. The pulper in general use in this country is Gordon's cylindrical pulper, but this season one of Walker's twin disc pulpers was imported and proved a great success. Some planters with a very limited maiden crop do not care to go to the expense of purchasing a pulper, and their coffee when picked is generally pulped by hand and dried. From what I can gather the average out-turn of coffee per acre in this Protectorate is from 3 cwt. to 3½ cwt.; there have been exceptional cases where as much as 17 cwt. per acre have been taken, but this result can in no way be taken in making an estimate. In neglected gardens a return as poor as 50 lbs. to 60 lbs. per acre has been realised; but it is generally considered that the above estimate of 3½ cwt. per acre is one which can be relied on if ordinary care is taken of the plantation.

During 1894-95 much greater care was taken in the cultivation of coffee than was hitherto the case. The system of "topping"* was universally adopted, though not to the extent to which it is carried on in Ceylon and India. This will to a greater extent necessitate the training and up-keep of a permanent staff of natives to handle and prune the coffee in a proper manner, otherwise "topping" will do more harm than good. Another measure that has been more adopted than formerly is the replenishing of the soil by manure in some cases, and in others by trenching and forking. The results of these measures will on the one hand tend to reduce the excessive bearing of the maiden crop, but will bring about a more regular system of bearing for a number of years. A great deal of diseased berry was found amongst the 1894-95 crop, due, it is thought, to the early fall of the rains, which brought the coffee prematurely into blossom, leaving the seed to suffer from subsequent droughts. Other persons hold the opinion that empty or diseased berry is caused by the presence of a beetle resembling the ladybird, which has been very prevalent in some districts. The Ceylon planters assert that the cause lies with the well-known green bug, an insect which sucks the sap of the coffee tree, and that the remedy is to be found in shade and good manure.

The coffee sent home in 1895 realised higher prices than those quoted for 1894, and some samples are said to have been bought at the record price of 111s per cwt. The prospects of the coming crop of 1896 are good beyond all previous years, chiefly owing to the abundant rainfall, which has been at least 10 inches above the average.

I attach to this Appendix a sketch map showing the estates, a portion of which are under coffee, or which are intended for the cultivation of coffee. The area covered by this map is the southern portion of the Shire Province.

In drawing up this Appendix on coffee planting I have to acknowledge much assistance from Mr. J. E. McMaster, and have also to mention that all the planters when applied to were ready to supply me with information. H. H. J.

* Cutting off the primary shoots of the tree so that its secondaries may develop and come into bearing.

LANTANA—THE FORESTER'S FRIEND?

I do not see why your esteemed correspondent, C. Bagshawe, should accuse me of josting on this sad subject. Sure nobody can have a more thorough objection to jokes—at times than myself. I am, however, seriously obliged for the interesting extract quoted and can only hope for pardon if I suggest that the real inward gist thereof is precisely what I said in March; *viz.*, that we do not know everything about *Lantana*, and that there is at least room for two opinions as to its possible utility in forests, if rightly used. I am quite ignorant as to who was Mr. Lawrie's predecessor, so have no idea which of the two carries the greater professional weight, but the extract from the Coorg report simply shows that Mr. Lawrie disapproves of *Lantana*, whereas his predecessor held the contrary opinion. Having had under my charge certain of these impenetrable *Lantana* jungles, I certainly never advocated sitting at ease while the *Lantana* over runs the whole country. What I still advocate is using the *Lantana* as a servant, and finding out the conditions in which it can be utilised, instead of going blindly to work trying to exterminate it by sheer expenditure of money. Rs. 17,000 have almost exterminated the plant from Berar, and it is open to Mr. Bagshawe to think that the expenditure in the future will be trifling but, it is also open to others to be less sanguine, and even to anticipate the need for a similar expenditure before say ten years are out. What have they got on the ground in place of the Berar *Lantana*? I do not know the circumstances or Berar, but if it is bare soil, I should be inclined to think the money none too well invested, while if it is grass, I should be inclined to think a good deal less of the bargain still, for it is my experience that grass is infinitely more dangerous than *Lantana* The facts disclosed in the Coorg report do not, in my opinion, go any way at all towards disposing of the Forester's-friend theory. All they prove is that a crop of young sandalwood was allowed to be ruined by *Lantana* for want of timely care. This want of timely care is not to imply any fault of the Forests staff being, doubtless, the necessary result of present conditions, but it would be equally unjust to blame the *Lantana*. What was wrong was the treatment thereof. I might venture to suggest that if the Rs. 17,000 spent in Berar had been spent in Coorg, the latter might have been the richer by large areas of sandal saved till it was able to kill out the *Lantana* on its own account, while Berar might have been, as Ingoldsby says, not one penny the worse. VALLEDA.—*Indian Forester.*

PLANTING PROSPECTS IN FIJI.

With its productive soil and, without doubt the healthiest tropical country in the world, Fiji hae a magnificent future in store for it, but the pity of it is that its consummation is not somewhat hastened by a little display of wisdom in the directing of its affairs. New blood, in the shape of intelligent, young and energetic men, with a small amount of capital, is sorely needed to settle upon and develope its acres, and money in the shape of a loan to be devoted to the specific purpose of improving its fortunes is of first importance. If the condition of the country is to be improved, coolie labourers require to be imported, and other initial expenses, inseparable with any scheme for encouraging colonisation, require to be provided for. If an addition of desirable colonists is to be secured it will be necessary that the inducements be such that they be sufficiently attractive. Were a dozen or two of planters to arrive here, tomorrow say, from the sugar districts of New South Wales, where they are threatened to be "froze out" by the new tariff conditions of that colony; or, it may be—and many of us fondly hope that such will be the case—that a few gentlemen, learning that Fiji is likely to be famed as a tobacco producing country, were desirous of throwing in their fortunes with us, the question of an adequate supply of labourers would be a very serious matter, and its absence would go a long way to cause them to waver in their preconceived determination of making their home in this country. New people coming here with monvy in their pockets, bent on a certain purpose, would not appreciate having to wait the best part of a year before their requirements with regard to labour could be satisfied. "Life is too short," they would say, "We'll go and try Queensland or the New Hebrides: both out money and our presence will be welcome there." Again, another drawback to our labour conditions in the employment of coolie labourers, to men of small capital, would be the planking down of the whole cost of their introduction fees before they entered service. For large capitalists and corporations this course would possibly be a matter of supreme indifference, but it would be otherwise with individuals of limited means. To a well-regulated system of labour supply in the hands of the Government, it should not be of supreme importance whether or not the cost of introduction were paid down on the nail or distributed by half-yearly payments over the five years of coolie indentureship. Before, however, the Government could so accommodate the planter it would be necessary that it poss-

essed the funds to enable it to do so, and a loan for the purpose would be a necessity. A loan for a like purpose sanctioned by the Secretary of State, was recently negotiated on the London market by the Crown Colony of British Guiana. In many other ways the future of the colony requires to be anticipated. For instance—and we are not sure but that the funds of the colony may be of a sufficiently elastic nature to permit of the expense being defrayed out of revenue—the natives at their last annual meeting suggested for the consideration of the Governor, that a commission of one or more be sent to Honolulu to find out the method of preparing dalo there, as the chiefs here, were desirous of adopting so good an example. The same commission might also, with advantage, learn something with reference to rice cultivation, and the profits which accrue. Wrinkles might also, at the same time, be gleaned with respect to sugar-cane growing and manipulation with economies, and the methods pursued with regard to packing and shipping bananas to San Francisco. And if the experiences gleaned were afterwards approved of and deemed advantageous, there is no reason why the Mauritius should not be visited, and this colony instructed what is being done there with the fibre industry, as we are informed that the fibre plant which flourishes so well in this colony is of the same variety as that which is manufactured in Mauritius. And then, why not Cuba be likewise visited. The "prospect" is certainly encouraging enough if we were only a little more enterprising. Wrinkles with regard to sugar could be noted but more particularly with respect to Havannah tobacco and cigar manufacture. The condition of that unfortunate island is such that there should be little difficulty at this time in inducing a small colony of say a dozen tobacco producers and cigar manufacturers to transfer themselves from that fever and war-stricken country to Fiji, were opportunity afforded them. The tobacco industry at Jamaica is not yet, if we remember rightly, forty years old, and was introduced into that country much in the same way as now suggested. All the products we have enumerated are grown here, but the colony requires to glean more exact information regarding their growth and manufacture. In fact we require to be fortified with a lot of technical matters with regard to them which can only be ascertained by some cute messenger whose services require to be retained for the express purpose, and we think the public exchequer should defray the cost. The amount of energy now being displayed by Governments, both small and large, in leaving no stone unturned to keep their people well-posted in all matters affecting their natural products would have been viewed as marvellous a few years ago but is now only regarded in the light of a duty engendered by competition and as absolutely a necessity if the survival of the fittest is to be justified and maintained.

If no ability or inclination be evinced on our part to enter the arena of progress than we have only ourselves to thank for our supineness if other countries march ahead of us. If there be no seed-time on our part then we are perfectly certain there can be no harvest. And it should be plain to all of us that if our progress be not nearly so rapid as our neighbours, its cause must be attributed to our lack of energy and that our non-progressiveness is but a consequent and natural effect.—*Fiji Times*, Sept. 9.

VEGETABLE PRODUCTS OF AMERICA.

From Ratzel's "History of Mankind," Part XI, we quote the following:—

The climate of America used in the last century to pass for inordinately cold and damp, and the highly premature question, whether it were not detrimental to the development of American humanity, long formed a standing subject of discussion. America embraces very hot and dry regions; but in the north the Arctic climate penetrates so far into the continent that even Labrador, in the latitude of England, is an inhospitable polar country. Cold winters and hot summers characterise the larger part of North America. The southern half of California on the Pacific coast is an Italy-like oasis; but as we proceed inland, with the rising ground the driest portions of the continent soon come into view. It is only to the east of longitude 98° W. that agriculture is practicable without artificial irrigation, and that forests or even groves of any extent are found.

In Mexico, too, and as far as Patagonia, the western region is the driest. Westward of the tributaries of the River Plate we come into a district the steppe-like character of which quite reminds us of that about the sources of the western tributaries of the Mississippi. The Pampas may be called the prairies of South America; the wormwood flats of the north are reproduced in the Chañar steppe at the foot of the Andes, and the desert of Atacama in the Salinas and the Campo del Arenal. But the genuine prairies are the Pampas which from Cordoba to Patagonia, between 29° and 40° S. latitude, cover a soft soil free from shingle—one of the most monotonous grass-steppes in the world. Further southward comes the Patagonian steppe with its rough stony soil.

Between the tropics lies a highly-favoured region of the world. The manifold configuration of the ground offers a rich variety, and above the eternal midsummer of the Amazon and Orinoco lowlands, eternal spring is gorgeous on the lovely middle slopes of the Cordilleras. It is just the regions of the ancient civilization of America which share this good fortune; Mexico, Bogotá, Quito, have perpetually a temperature of early summer, while in Quito the difference between summer and winter is not more than 3°. Near Cuzco the spring is permanent, at least in some charming oases.

Flora and fauna are richly developed, but have supplied fewer cultivable plants and domestic animals than has the Old World. Maize, potatoes, sweet potatoes, tobacco, cacao, *maté*, are all we can name as having acquired importance for mankind; while of animals hardly any can be picked out. Turkeys, the cochineal insect, guinea-pigs, stand at most on the same level as vanilla. The later acquisition for medicine of Peruvian bark and *curare* gives reason to hope that many another valuable product may yet spread from those countries over the world. One can point to a long list of plants of which the settlers have learnt from the Indians, and which have become useful and often indispensable to them, grain-bearing grasses among them—the *zizania* or water-rice of America, and the floating *glyceria*; then the *echinochloa*, cultivated in Mexico like millet, the *Euchlaena luxurians*, closely akin to maize, growing wild in Guatemala, and bearing there the name *teosinte*, "the maize of the gods." Species of *milium* and *panicum* with edible grains occur in South America. If we add the *quinoa*, the Peruvian grain-bear-

ing plant which holds a position like our buckwheat, we have a whole list of meal-producing plants, among which, however, only maize in its numerous varieties was generally cultivated in the tropical and temperate regions of north and south. Not until the introduction of domestic animals from Europe was the great wealth of nutritious grasses utilised. Among many races of ancient America, and above all among the more civilized, vegetable diet prevailed over flesh food. To the great wealth of tropical America in palms corresponds in some measure the abundance of useful articles which are produced from them. Even bamboo hardly fulfils so many uses as the *carnahuba* palm of Brazil (*Copernicia cerifera*), which lasts through the worst and longest droughts, remaining always green and juicy. Its root has medicinal properties similar to those of sarsaparilla, and from the stem fine strong fibres can be drawn. Its wood can be worked for poles, beams, laths, palings, musical instruments, pipes, and pails. The young leaves, when fresh, afford a nutritious food; the tree further furnishes wine, vinegar, sugar, and a gum, resembling sago, which in times of famine has often been the sole sustenance of the Indians. Besides this, flour, and a whitish fluid like the milk in the coconut, have been obtained from it. The soft fibrous substance in the interior of the leaves and stalk is a substitute for cork. The fruit has a flesh of agreeable flavour, the oily kernels are roasted, ground, and used as coffee. From the dried leaves are made hats, mats, baskets, and brooms, and a kind of wax for candles is also obtained from it. Wax is furnished also by the slender *Ceroxylon andicola*, one of the handsomest of trees with its 200 to 250 feet of height. The Tagua palm gives vegetable ivory—with caoutchouc and Peruvian bark one of the few natural products of South America which have made their way to any large extent into trade. The fan-like leaves of the Brazilian king palm (*Oreodoxa regia*), nearly forty feet in length, find a use in various directions. The Mariba palm has edible fruit; the juicy sweet flesh in which its seeds are covered is a great delicacy with the Indians, and a *maximiliana* covered with ripe fruit is not likely to remain long unspared by travellers. Two or three palms in the north of South America furnish cooling drinks such as the Caribs especially love. The Macusi Indians knead the orange-tinted porridge-like pulp of the *mauritia* into a dough which they tie up in the leaves of the mariba palm and take in water. From the dark violet roots of the *turu* palm also, the Indians and Negroes of Guiana brew a cooling drink by the addition of water. In consideration of the many uses to which palms, otherwise of no value, can be put in the way of building, timber roofing material, and so on, the more intelligent among even the Indians long since began to take care of them and plant them, especially the coco-palm and, on the Mosquito coast, the *sugar* palm.

The primeval forest of South and Central America contains edible fruits in abundance—guava, the *ochuba* resembling the winter cherry, *curupa* and *chulupa*, mammee, *chirimoya*, avogado pear, cashew nut, *ciruela*, pine apples, *grenadillas*, the fruits of a passion flower, solanums of all kinds, from the cherry tomato to the pungent chillies which furnish the so-called Cayenne pepper, the indispensable seasoning of all Indian foods. Almost all have spread far beyond the confines of America. North America has a whole list of nut trees, including walnut and hickory. The nut tree of Colombia rivals the walnuts of Europe and America. Many leguminous trees furnish edible seeds. There are mulberries in North America and on the plateau of Bogota. In higher situations, and in the most southerly parts of South America, there is also an abundance of berries, even in Colombia species of *rubus*. In North America the fruits of two kinds of chestnuts are eaten; there also edible nuts are borne by two species of hazel, and in the south by some witch hazels. Sweet acorns are gathered from the live oaks; in the west the *piñon* has edible oily kernels; the wild papaw or melon tree (*Papaya vulgaris*) furnishes fruit like melons; species of wild plum are widely distributed. In North America various species of the vine grow wild, some very productive and of well-flavoured fruit which are now cultivated in Europe.

Even the far west of North America, and again, in spite of their steppe-character, the plains of South America, are by no means destitute of edible fruits. In the region of the Rocky Mountains and the Great Basin there are plums, cherries, raspberries, blackberries, currants, and gooseberries. In California meal made from the fruit of the *manzanita*-bush is an important article in the economy of the Indians. Schmiedel mentions bread made from the seed of a leguminous plant as being eaten by the Indians of the Pampas. In New Mexico and West Texas there are two species of mulberry and several of vine. Under the name of *panoche* the Indians of California know a saccharine substance of the nature of manna, which is exuded by aphides on the leaves of the reed; and also the sweetish juice of the sugar-pine (*P. Lambertiana*), which, however, tastes, more of turpentine than of sugar. The well-flavoured sugar of the sugar-maple is to the present day of importance for the settlers in the east of North America. Besides the numerous conifers, rich in balsam and resin, we may mention the wax-berry, from the berries of which a wax-like substance is obtained by boiling. For a black dye the North Americans employ the seed of the sunflower and the bark of the willow, and for red the roots of *savoyenne* and buffalo-berry. For fishing-lines they use the bast of the maple, the red cedar, or the stalks—as thick as a finger—of a giant oar-weed. Of medicinal herbs there is no lack.

Yuccas and agaves furnish fibrous materials. In old Mexico paper was prepared from the fibers of the maguey and the bast of the india-rubber tree. At the present day the fiber of the sisal agave of Yucatan is in demand. In the highlands of South America similar materials were afforded by *fourcroya* and the *bromeliaceæ*. Caoutchouc is obtained from various trees and creepers; the dried juice of the *Mimosops balata* is used by the Indians of Guiana to smear their arrows; when fresh they drink it like milk: the fruit is equally appreciated by men and monkeys, and the wood, under the name of *boteri*, is one of the favourite building timbers of Venezuela. The resin of the *mani* serves for stiffening bow-strings. In the Colombian lowlands all the huts consist of bamboo, which grows in quantities near the Cauca. The flesh of many species of cucumber is eaten, while others provide calabashes, but the favourtie kind, called *totuma*, is made from the hollowed-out fruit of the *Crescentia*. The South American Indians paint themselves with annatto from the *uruku* (*Bixa orellana*) and the *genipaba* (*Genipa americana*). Nowhere is nature so well adapted

for the hunting and forest life as in America, and in North America at least full justice has been done to her wealth. It would require a book to recount all the materials used by the Indians. Only a few examples need here be given. The Canadian refreshes himself by chewing the sapwood of the poplar called "La sèvre"; the juice has a pleasant sweetish taste like water-melons, and acts as a restorative. When snow covers the prairie this is often the only food for horses obtainable in the absence of fodder. The Wintuns of California often fill their stomachs in winter with the sweet bark of the yellow pine. On the upper Saskatchewan, when hunting and fishing fail, the Indian scrapes a lichen, *gyrophora*, and boils it into a nutritious jelly. Among the Yuma tribes the roots of the *mescal* (*Agave deserti*) are roasted and eaten for the sake of their flavour. The stone-pine affords nuts; the *opuntia* and another cactus, the *Pitahaya*, sweet fruits; the locust-tree sweet pods, and, in its seed when crushed, a nutritious meal; *amole* (yucca) edible fruit and tough fibre; palmetto, in its leaf-buds, a substitute for cabbage; the young leaves of *Agave americana*, when cooked, a savoury dish. Leaves of certain *ericaceæ* furnish tea, and the arbutus is mixed with tobacco. Of edible fungi 108 kinds are reckoned in North Carolina alone. The so-called "Indian bread" is a fungus attaining a weight of 30 lb. The tomato is everywhere employed. Vanilla first attained importance through Europeans; but cacao was used and valued in earlier times. The coca of Peru (*Erythroxylon coca*) was known even into Central America as *nayo*; each leaf was separately detached from the stalk with the thumb-nail, and dried in earthen pots over the fire.

Imported plants have become widely distributed, in some degree even those which white settlers did not cultivate. Thus bread-fruit grows wild in some of the West Indian islands, where the indolent and contented negroes require hardly anything further for their sustenance. The cultivation of sugar and cotton in plantations has hardly brought any advantage to the individual Indian, since he lacks capital and organising power; but in Mexico and Central America coffee-planting, which requires only hard work and the hoe, has had a more favourable effect; and the same may be said of tobacco. On the other hand, the Indian has nowhere adapted himself to such forms of cultivation as those of the vine or the olive; nor indeed have the Indians, even when settled for generations, taken to agriculture in the European style as it is carried on in the temperate districts or North America, the Tierras Frias of the Mexican and South American highlands, or on the River Plate, so readily as to cattle-breeding, which has turned them and the half-breeds on the Llanos and Pampas into distinctly pastoral nomads, under the name of *llaneros*, and *gauchos*, and races of horsemen.

SELANGOR PLANTERS' ASSOCIATION.

We have received a copy of the minutes of a general meeting held on Saturday, 26th September.

The following resolution proposed by Mr. Gibson and seconded by Mr. Carey was carried unanimously:—

"That the Association should again address the Government on the subject of sales of land by auction in Selangor, with a view to having the State put on the same footing as the rest of the Federated States, where grants of land are given to suitable applicants."

The Chairman laid on the table a draft copy of a Bill entitled "An Ordinance for the Protection of Indian Immigrants," which had been sent to him as a member of the late Labour Commission, by the Colonial Secretary, and he drew the attention of the meeting to various points in the Ordinance. After some discussion it was resolved that the Hon. Secretary should write to the Colonial Secretary asking if the operations of the Ordinance is to be confined to the Colony, and if not whether a certain number of copies could be supplied to the Association, failing which it was agreed that they should be printed in the State and distributed to members.

7. Read letter from the British Resident to the Chairman, forwarding a draft of the "Federal Produce Protection Enactment, 1897," and intimating that the Government will be glad to receive the views of the Selangor Planters' Association. Resolved that the letter be acknowledged and the Government thanked for forwarding the proposed Enactment, which is approved of by the meeting, and that printed copies be sent to all members with a view to ascertaining the general opinion of the planting community.

8. Mr. Huttenbach addressed the meeting on the subject of Government inspection of oil engines, as prime movers, for which a fee is charged, although they are free from the risk and danger attending steam engines. Resolved that the Hon. Secretary enquire as to what is done in other countries before taking any further action in the matter.

ZANZIBAR CLOVES.

There have been signs lately of an impending speculative movement to force up the price of Zanzibar cloves. In the early part of the month a Mincing Lane firm of brokers, who are currently reported to act for a rich "syndicate," actually purchased considerable quantities, although the price did not advance beyond one or two points. It is well known that in the early days of the late Colonel North's "camphor syndicate" the speculators banded together under that *Sobriquet* attempted to corner the clove-market along with the other departments of the Mincing Lane produce-trade to which they turned their attention. The clove speculation was unsuccessful from the beginning—as, indeed, it could hardly help being, considering the enormous supplies of the spice in Europe and the East. It was quickly and quietly dropped, but it is now said that the recent tentative movement was engineered by some members of the old "syndicate" resuscitated. Whatever truth there may be in this statement, a more inopportune time for an upward movement in cloves could hardly be imagined. Sheer over-production has forced down the price of Zanzibar cloves to almost the lowest figure on record. There is no prospect—barring a total failure of the crop or a destruction of the plantations by a hurricane—that there will be any considerable diminution in the supply. The stock in the London public warehouses alone is about 81,000 bales—equal to one and a half year's average output in Zanzibar—and there is no reason whatever for assuming that there will be a marked increase in the consumption. It is rumoured, indeed, that over one-half of this enormous London stock has been quietly bought up by the syndicate, but no convincing evidence is brought forward to bear out that assertion. Clove oil (the chief article of pharmaceutical interest) is now lower in price than it has ever been, and a halfpenny advance in cloves would almost certainly react upon the oil-market.

The chief reason which has been brought forward as a possible cause for a permanent advance in the price of cloves is that, after the recent events in Zanzibar, slavery may be abolished in the Sultanate. As the clove-plantations, which are almost entirely owned by Arabs, are worked by slave-labour, it is thought that the cost of production of the spice would, in that case, be much increased. That

may be so, but in the meantime there is nothing to show that there will be any change in the conditions of labour in Zanzibar yet awhile.

According to a recently-published report of the British Consul at Zanzibar, the production of cloves shows a tendency to increase, in spite of the low prices that have ruled for some years. The total quantities of cloves brought to market in Zanzibar during the past six years (in frazilehs of 35 lb.) have been—

Year.	1890.	1891.	1892.	1893.	1894.	1895.
Zanzibar cloves	124,929	69,388	121,398	108,090	138,691	146,397
Pemba cloves	384,933	324,252	236,211	259,367	372,999	391,460
Total	509,862	393,640	357,609	367,457	511,690	537,857

Not much bope for speculators here. These figures represent the actual quantities brought into Zanzibar from the "Shambas," or plantations, between January 1 and December 31, although the proper season when cloves are picked, dried, and brought to market extends from September to March. They show that the production during 1895 is the largest of the series. The continued heavy crops have caused a glut in the home markets, although shipments at the lower prices are still being made, especially to Bombay, Marseilles, and Hamburg, which three ports, indeed, absorbed most of the consignments during the last half of 1895, London taking comparatively but a small quantity.

In 1895 there were three convictions under the proclamation of the Sultan against the adulteration of cloves. The cloves, which were in these instances imported by British Indians from Pemba, were found to be adulterated with salt, and were seized and publicly burned; and this action has already had a deterrent effect on a practice which was becoming very common.—*Chemist and Druggist*, Sept. 26.

THE DEPRESSION IN GAMBIER.

The gambier market is in a position most unsatisfactory to all concerned, importers, dealers and consumers alike. Usually the last named are pleased at the low prices, but in this instance they hold large stocks, which they cannot make use of, and which they purchased at prices higher than those now prevailing.

The present price is the lowest in many years, if not in the history of the article, some in the trade remembering 3⅜c. as the lowest price previously reached. The depression is really due to lack of business in the industries which use gambier. Trade has been dull all the year, yet the shipments were maintained about on a par with 1895, and under such circumstances there could be but one result. The situation September 1, showed shipments from Singapore to Atlantic ports, from January 1, 63,000 bales, againt 66,000 bales for the same period in 1895. The deliveries were but 49,000 bales, against 91,000 in 1895. The visible supply at Atlantic ports from September 1 to December 31 is placed at 44,000 bales, which includes a stock in store of 12,000 bales, and a stock to arrive of 32,000 bales, not counting steamer lots, either direct or from London. The Hankow arrived September 5, with 2,300 bales direct, and the America from London, September 6, with 1,800 bales, and other lots may follow to swell the visible supply. The deliveries for the last four months were 49,000 bales in 1895, 30,000 bales in 1894, and 25,000 bales in 1893. The visible supply, therefore, for the next four months is 47,800 bales, almost equal to the deliveries for the first eight months of the year. With a falling-off of 42,000 bales over 1895 in the deliveries from January 1 to September 1, it is not to be expected that the deliveries for the next four months will aggregate those for the same period in 1895.

Sales have been made at 2 92½c during the week, and while the market appears a little firmer, it is doubtless due to the non-arrival of the "Falconhurst" with 8,000 bales. Most of this cost originally 4 to 4⅛c, and it is a noteworthy fact that consumers have been free sellers of their surplus at the low prices. It cannot be said that there is any immediate prospect of an improvement in values.—*Oil, Paint and Drug Reporter.*

PLANTING AND PRODUCE.

Some Facts of the Tea Trade.—The various consular reports from China show that although the decline in the export of tea from the Celestial Empire to Great Britain and her colonies goes on, there are markets in which China still holds the field, and that these have yet to be won by Indian and Ceylon planters. The export of tea from China to Great Britain, Australia, and New Zealand shows a most marked decrease. In 1887 the export of tea to Great Britain was over 793,746 piculs. Since that date it has shrunk to less than a third of that amount. The export to Australia was in 1895 less than half that of 1887, and the export of tea to New Zealand has become insignificant. Such are the effects of the competition of India and Ceylon. It is far otherwise with the export of tea from China to Russia. The trade report of the Imperial Maritime Customs states that "the purchase of black tea at exceptionally high prices, both for the Odessa market and for transmission via Kiakhta, were the largest on record." A considerable quantity of tea is also sent to Siberia from Hankow, up the river Han to Fanch'eng, whence it is carried forward overland, in addition to that which passes through Tientsin, the bulk of which consists of black and green brick tea. It is clear that the export to Russia is the mainstay of the China tea trade, and that it is to the development of that branch of it that the small difference between the amounts exported in 1895 and 1894 are due. The Chinese variety of tea is still popular in the United States, but even there the amount imported from China is not so large as formerly, and the trade is a declining one. In 1895 the amount of tea exported from China to the United States was 311,120 piculs, as compared with 403,196 piculs in 1894. The tea trade is one which has been more particularly affected by the events of the last two years. Until recently the whole of the Formosa crop was exported to foreign countries via Amoy. Now that Formosa has become a Japanese possession it is unlikely that this state of things will continue.

The Effect of Likin.—Mr. Cass, in his paper on the Amoy tea trade, forming Annex E to the Trade Report for 1895, drawn up by Mr. Gardner, Her Majesty's consul at that port, states that the tea districts in the neighbourhood of the city in question are among the finest in the world. They have, however, been thrown out of cultivation and almost depopulated owing to the present method of local taxation, notwithstanding the fact that labor is extraordiarily cheap, that the communications (by water) are excellent and that the harbour of Amoy is extremely convenient for shipping. Mr. Cass is of opinion that "as matters stand at present, so far as Amoy is concerned, there will in the near future be no tea to collect either likin or duty upon Twenty-five years ago 3,000,000 dollars was the annual income of the Amoy tea districts; today it is not 350,000 dollars. Likin has done it.

Foochow and the United States.—The diminution of the export of tea from Foochow is very marked. In 1893, 54,000,000 lb. were exported; in 1894, 53,000,000 lb.; and in 1895, 48,000,000 lb. The export of brick tea is, however, increasing being 10,000,000 lb. in 1893, 11,000,000 lb. in 1894, and 13,000,000 lb. in 1895. There are some peculiar teas, such as Souchong, and some scented varieties, only obtainable at Foochow, which will always maintain a certain trade. The tea trade of Foochow with Australia is likely to come to an end in the near future, as Indian and Ceylon teas are rapidly displacing those of China in those colonies. There has, however, been a great increase in the export of tea from Foochow to the United States, namely 12,000,000 lb. in 1895, as against

6,000,000 lb. in 1894, but as has already been pointed out the total export of tea from China to the United States has greatly diminished, as Indian and Ceylon growers are doing their best to push their teas in that quarter also. Her Majesty's consul at Foochow remarks on the weight of taxation which is crushing the tea trade there, and states that the dues levied on common teas amount to 30 per cent. on the value.

Coffee Planting Enterprise.—Some financiers in the City have been turning their attention to the coffee planting enterprise, under the impression that it has been unduly neglected so far as British capital is concerned since the unfortunate collapse of the industry in Ceylon nearly twenty years ago. The croakings about over-production of tea and dismal forecasts as to the outlook in the few years time may have assisted in bringing about this flutter of excitement in coffee, but it is mainly due to the success of tea planting as an industry and the desire to emulate it on the same lines. As only about 27 per cent of the coffee entered for home consumption comes from British possessions, in contrast to 88 per cent. of the tea supply from India and Ceylon, there is a field for an increase in the cultivation of coffee in territory under British rule, provided always that conditions are favourable to placing it on the market at competing prices. The consumption of coffee does not increase, and there seems no prospect of this while tea has so many advantages over it. The hope for British-grown coffee lies in its being able to successfully compete with the product from South America and elsewhere.

The Coffee Market.—The coffee market is a perplexing problem to gauge, and the element of speculation which enters so largely into the European market consequent on the difficulty of fixing the precise limits of the growing crops, especially in Brazil, is one of the coffee planter's main troubles. Dealing with the subject of coffee prospects at the present time the *Grocer* says: "Certain facts have come to light which tend to confirm the belief that the entire Brazil crop for 1896-97, now in course of being gathered, will turn out to be unprecedentedly heavy, and the aggregate yield of about 1,0000,000 bags, predicted as far back as October last, is likely to be attained. It is estimated that this amount will be produced as follows: By a crop in Rio of 4,000,000 bags, one in Santos of 5,000,000 bags, and by yields in Bahia and Victoria of 1,000,000 bags. This will be nearly double the total outturn in 1895-96, when it was not more than 5,489,000 bags of all kinds. Contrast the above figures with those relating to the Brazil coffee crops in the poor, lean years of 1893-94 of 1889-90, and 1887-88, when the quantities raised were respectively confined to, say, 4,300,000 bags, 4,220,000 bags, and 3,012,000 bags—and it will be seen what immense strides have been made in the planting and growth of the Brazil description of coffee within the past nine or ten years. Such an enormous increase in the available supply of coffee, therefore, cannot fail to influence the market in favour of buyers by bringing about a much lower range of prices. It is also argued that, and . . the promised abundance does not consist of the . . . of coffee exactly suited to the tastes of British or European consumers, it is none the less sure to serve as a useful substitute for the higher-priced plantation sorts. Some foreign drinkers of the beverage, whose palates are not so nicely discriminating in their choice between passable or medium qualities and grades of a richer flavour, may discard the former in favour of the latter, especially in view of the greater comparative cheapness of the article. Mention of one or two instances will suffice to show that there has already been a considerable fall in value since it became known that a thumping crop of Brazil coffee was practically assured for the present season. From 55s and 52s 6d in the middle of last February, down to 50s 6d and 44s recently, there has been a fall in quotations of 4s 6d to 8s 6d per cwt. for September and December deliveries of fair Channel Rio, as recorded by the London Produce Clearing House. 'Good average" Santos has declined in proportion, and from 52s 9d in July the price here has since fallen to 48s, which is a moderate figure: whilst in Havre the same quality of coffee has lately been disposed of in the terminal market at 60½fr, instead of 75fr in June last, and 96fr to 100 fr in September, 1895 and 1894. Regarded thus, the position of coffee just now is one from which the home trade in London may derive real encouragement, as it seems that more reasonable prices for the favourite berry are about to set in and rule for some time to come. Once Brazil coffee grows to be relatively cheap, it will be a pretty true harbinger of easier rates for what are termed 'fancy' colour sorts. As the depreciation in common coffee goes on, the disparity between that and prices for the finer grades will doubtless appear more marked, and the low valuations in the one case will help to bring down extremely high rates in the other."

Coffee Looking Up.—Another large coffee company. This time in the East. It is called the Malay Peninsula Coffee Company, Limited. It has a capital of £100,000, divided into equal proportions of 6 per cent. cumulative preference and ordinary shares of £1 each, subscriptions being invited for 50,000 preference and 30,000 ordinary. It is acquire, as going concerns, certain coffee estates, comprising about 10,000 acres of land held on leases for 999 years, in the protected state of the Malay Peninsula. The area now under coffee of various ages aggregates about 1,048 acres of which 538 acres are in full bearing, 108 acres in partial bearing, and 402 acres young plants, which come into bearing in 1897 and 1898. The profits for the year ending October 31, 1895, are certified, at an exchange of 2s 2d, to have amounted to £6,350, and those for the current year are estimated, on an exchange of 2s 2½d, to amount to £7,075. The purchase price is £92,000, of which £72,000 is to be paid in cash and £20,000 in fully-paid ordinary shares. The directors are Sir Alexander Wilson (chairman of the Mercantile Bank of India, Limited), R. J. Boyle (chairman of the Moabund Tea Company, Limited), and D. M. Lumsden (chairman of the Port Dickson Coffee Comany, Limited), who wi l join the board after allotment. It is announced that Mr. Thomas Heslop Hill, the principal proprietor of the estates, has consented to undertake the management of the estates for a period of five years. The following contracts have been entered into: A contract between Thomas Heslop Hill and Thomas David Traill of the one part, and Richard Blam ey Magor, as Trustee on behalf of the Company, for the purchase of the Siliau Coffee Estate, dated September 8, 1896. A contract between Thomas Heslop Hill of the one part and Messrs. George Williamson & Co. and D. M. Lumsden of the other part, dated September 22, 1896, with reference to assisting in the formation of the Company.—*H. and C. Mail*, Oct. 2.

DEAFNESS. An essay describing a really genuine Cure for Deafness, Ringing in Ears, &c., no matter how severe or long-standing, will be sent post free.—Artificial Eardrums and similar appliances entirely superseded. Address THOMAS KEMPE, Victoria Chambers, 19, Southampton Buildings, Holborn London.

DRUG REPORT.

(From the *Chemist and Druggist.*)

London, Oct. 1st.

Areca-nuts.—Sixteen bags we e offered today, for which 25s per cwt. is asked, but that figure was not obtainable at auction.

Cardamoms.—In strong demand, with keen competition. At auction 166 cases were all disposed of at an irregular advance, averaging about 3d per lb., but in some instances much exceeding that figure. The following prices paid :—Ceylon-Mysore, fine pale medium to bold plump, 3s 7d to 3s 8d; medium fair pale 3s 3d to 3s 4d; small to medium yellowish and brown 3s to 3s 2d; small yellowish 2s 8d to 2s 11d; ditto brownish 2s 5d;

medium to bold brownish and split 2s 8d; very small pale and dull brown split 2s 1d to 2s 2d per lb. Ceylon-Malabar, fair round brownish 3s 1d per lb. Seed realized from 3s 1d to 3s 5d per lb. The exports of cardamoms from Ceylon between January 1 and September 8amount to 222,096 cwt. The "Wanderer" has brought 39 cases from Ceylon this week.

CUBEBS.—Quite neglected. A parcel of 31 packages fair berries, not stalky, from Bombay, was bought in. The price suggested is 35s per cwt. Five bags small, fair, stalky, slightly damaged, berries sold at 5s per cwt. Of a further supply of 127 bags, 10—bold2 brown berries, from Singapore, without stalk—realised 25s. per cwt. Cubeb-stalks were apparently unsaleable at any price.

KINO.—The auctions today included about 750 lb. (in 7 cases) of good bright reddish, very stringent African kino. No bids at all were made for it, evenwhen 6s per lb. was suggested, and whole parcel was bought in at nominal rates.

KOLA was in considerable supply today, 73 bags, mostly African, being offered; 2d per lb was refused for one lot, and the bulk was bought in; but a lot of good brown West Indian sold cheaply at 5d per lb. Twenty bags of San Domingo kola, a new and very bold variety, were shown today, and bought in. This appears to be the first time that this kola has been seen in our markets. It is said that between three and four tons have lately been shipped to this country and the Continent.

NUX VOMICA.—We have to report an arrival of 351 packages from Madras, and 5 from Amsterdam.

OILS (Essential)—The output of Citronella oil in Singapore in 1895 amounted to 400 cases of 36 21oz. bottles. Among our imports this week have been 10 cases Patchouli oil from Singapore; 340 cases Camphor oil, of which 280 came direct from Kobe and the rest from Hamburg; and 81 packages Citronella oil, four cases fair pale Nutmeg oil were bought in at 2¼d per oz. Fifty-two quart-bottles of Cinnamon oil realised 6d per oz. Lime oil (W. I.) firmly held at 5s per lb. for good distilled or expressed. Lemongrass oil unaltered. At auction one or two parcels were bought in; on the spot 2d to 2¼d per oz is asked, and for October shipment 1 9-16th d. per oz. c. i. f. has been accepted. Citronella oil is somewhat firmer, with buyers, but no sellers, at 10½d per lb. c. i. f. shipment to end of year. On the spot the price is 1s 1d per lb. for drums and 1s 2d per lb. for tins.

QUININE remained quiet during the early part of the week, but on Tuesday a sale of 10,000 oz. B. & S., or Brunswick second-hand bulk, was reported at the price running up to 10¾d per oz., showing a slightly easier tendency today. The market closes with no sellers below 10¼d. It is stated that the deliveries of quinine from the London warehouses in September amounted to 110,000 oz. while the arrivals were practically nil. Some quinine made by a new French factory has recently been shown in the market. It is said to compare unfavourably with the standard brands, so far as appearance is concerned.

SENNA.—At today's sales 916 packages of new crop Tinnevelly senna were offered They met with excellent competition, both on the part of the home and the export trade, and almost the whole sold at full to dearer prices for ordinary and medium grades, while for good qualities, though scarce, the prices realised were hadly so high in proportion. Very common damaged to small dull specky leaves realised ¾d to 1d; ordinary small to medium dull to medium greenish 1¼d to 2d; fair medium greenish to good medium to bold ditto 2¼d to 3¼d; fine to bold picked leaves, from 3¾d up to 7d per lb. One hundred and twenty-five packages Tinnevelly senna have been received this week.

VANILLA.—About 125 tins, representing about 950 lb. were offered today, and partly sold without much change. Good crystallised Mauritius and Seychelles, 7½ inches to 8 inches 28s 6d to 29s; 5½ inches 7 inches, 23s 6d to 27s 6d; brown from 23s 6d down to 18s, and common qualities at correspondingly lower rates.

SMOKERS SHOULD USE
CALVERT'S DENTO-PHENOLENE,
A FRAGRANT LIQUID DENTIFRICE AND MOUTH-WASH.

Editor of *Health* says:—"The most effective preparation for ridding the mouth of the aroma of tobacco, and leaving a pleasant taste."
Sold in 1s. 6d., 2s. 6d., and 1 lb. 7s. 6d. bottles, by Chemists, &c.
F. C. CALVERT & CO., MANCHESTER.

INDIAN TEA SALES.

(From *Watson, Sibthorp & Co.'s Tea Report.*)

CALCUTTA, Oct. 14th, 1896.

A quiet tone prevailed in the sales held on the 18th instant. Good liquoring teas were wanted and prices kept fairly steady, but for all other kinds the market was weak and prices generally favored buyers. 24,209 packages changed hands.

Since the season opened on the 21st May last 19 series of sales have been held at which 364,266 packages sold at an average of As. 7-7 or about 8¼d per lb. as compared with 302,037 packages sold in 17 sales before the holidays last year at As. 8 or about 8½d per lb. and 314,111 packages sold in 19 sales in 1894 at As. 9-2 or about 9½d per lb. Details annexed.

The average price of the 24,209 packages sold is As. 6-10 or nearly 7¾d. per lb. as compared with 21,890 packages sold on the 10th October 1895 at As. 8-3 or nearly 9d per lb. and 23,781 packages sold on the 4th October 1894 at As. 8-5 or nearly 9d per lb.

The exports from 1st April to 10th October from here to Great Britain are 76,902,931 lb. as compared with 68,971,959 lb. at the corresponding period last season and 68,931,733 lb. in 1894.

NOTE.—Last sale's average was As. 7-2 or nearly 8d.

TELEGRAMS.—Reuter telegraphed from London on the 18th instant—Offered 56,000, sold 44,000 packages. Common to medium rather easier. Fine qualities full rates. Average 9¼d. "Type" 6¾d.

EXCHANGE.—Document bills, 6 months' sight, 1s 2⅜d.

FREIGHT.—Steamer—£1-6-3 per ton of 50 ft.

(From *William Moran & Co.'s Market Report.*)

CALCUTTA, Oct. 21st, 1896.

On the 1st inst., 25,596 chests were offered and 25,443 sold. Good to finest qualities alone maintained values, while common to medium sorts declined from a quarter to half an anna per pound. On the 8th instant, when 24,505 packages changed hands, common and mediums were again somewhat lower, good to fine showing no change. For Friday next about 30,000 chests are catalogued.

Signs of an early closing are reported from all districts; rain is wanted generally, and without this the manufacturing season will probably come to an end earlier than last year.

Total quantity of Tea passed through Calcutta from 1st April to 19th October.

	1896.	1895.	1894.
Great Britain ..	79,942,258	75,172,024	72,576,431
Foreign Europe ..	181,471	185,349	175,329
America ..	654,883	698,857	321,428
Asia ..	2,771,715	2,675,342	2,541,732
Australia ..	2,969,447	3,687,274	2,945,861
	86,519,774	82,418,846	80,560,781

THEFTS OF VANILLA IN MEXICO.—A wail comes from Mexico about the prevalence of thefts of vanilla beans, the thieves usually gathering them before fully ripe. So bold have the thieves become and so frequent are their raids that it is claimed the planters contemplate a change of crop, vanilla, owing to the losses by theft, being no longer profitable.—*Oil Paint and Drug Reporter.*

(COLOMBO PRICE CURRENT.

Furnished by the Chamber of Commerce).

Colombo, Oct. 27th, 1896.

EXCHANGE ON LONDON: CLOSING RATES, *Bank Selling Rates*:—On demand 1/2 21-32 to 11-16 4 months' sight 1/2 11-16 to 23-32 6 months' sight 1/2 23-32. *Bank Buying Rates*:—Credits 3 months' sight 1/2 21-32 to ½; 6 months' sight 1/3 1-32 to 1-16 Docts 3 months' sight 1/3 to 1/3 1-32; 6 months' sight 1/3 1-16 to ⅛

COFFEE.—Plantation Estate Parchment on the spot per bus., R16.50 to 18.00 Very scarce. Estate Crops in Parchment, delivery no quotations. Plantation Estate Coffee, f.o.b. on the spot per cwt. R90·00 to 100·00 For special assortment. Liberian parchment on the spot per bushel, no quotations. Garden and Chetty Coffee, f.o.b. per cwt. no quotations. Native Coffee f.o.b. per cwt. R72·00 to 74·00. TEA.—Average Prices ruling during the week: Broken Pekoe, per lb 53c. Pekoe per lb 42c. Pekoe Souchong, per lb 31c. Broken mixed and Dust, per lb 26c.—Averages of Wednesday's sale.

CINCHONA BARK.—Per unit of Sulphate of Quinine per lb 03½c to 04½c.—1½ to 5 %

CARDAMOMS.—per lb R1·70 to 2·50. Scarce

COCONUT OIL.—Mill oil per cwt. R16.00 Nominal Dealers' oil per cwt. R15·75 Coconut oil in ordinary packages f.o.b. per ton. R342·50. 355 in hhds.

COPRA.—Per candy of 560 lb R40·00 to 50·00

COCONUT CAKE: (Poonac) f.o.b. per ton, R60 to 80·00

COCOA.—Unpicked and undried, per cwt. R30 to 40 Out of season,

COIR YARN.—Nos. 1 to 8 { Kogalla per cwt. R9 to 18; Colombo ,, R7 to 14.

CINNAMON.—Nos. 1 & 2 only f.o.b. 70½c. Ordinary Assortment, per lb 66½c.

EBONY: per ton.—No sales.

PLUMBAGO:—Large Lumps per ton, R130 to 310. Very firm.

Ordinary Lumps per ton, R130 to 260. Very firm.

Chips per ton, R70 to 120. Very firm. Dust per ton, R30 to 90 Very firm.

RICE.—Soolye per bag, R8·50 to R9·75.
Pegu and Calcutta Calunda no quotation
Coast Calunda per bushel, R3·41 to R3·70.
Muttusamba per bushel, R3·50 to R4·00.
Kadappa and Kuruwe per bushel—No quotations.
Rangoon Raw 3 bushel bag R11·62 to 11·75.

FREIGHTS.

Cargo.	Per ton London per str. s. d.	N. York per str. s. d.	Trieste per str. s. d.	Mar'lles per str. R. c.	*Hamb', Bremen &c. s. d.
Tea	20/	..	20/	25	..
Coconut Oil	..	..	20/	25	..
Plumbago	17/6	...	20/	25	..
Coconuts in bags	17/6	..	20/	25	..
Other Cargo	17/6	..	20/	25	..
Broken Stowage	10/	..	..	..	..
SAILERS.					
Coconut Oil	..	30/	..	..	..
Plumbago	..	28/	..	..	..

New York rates per steamer with transhipment 12/6 to15/- above London rates.

*Hamburg Bremen Antwerp 15/ Genoa 17/6

LOCAL MARKET.

By Mr. A. M. Chittambalam, 7, Baillie St., Fort.

Colombo, Oct. 21 1896.

Garden Parchment :—	Scarce	per bushel
Chetty do :—	do	do
Native Coffee Scarce:—	59·00 to 60·00	per cwt
do f.o.b. do :—	70·00	do
Liberian Parchment,	12·50	per bushel (nominal)
do Coffee	63·00 to 64·00	per cwt
CARDAMOMS.—	1·00 to 2·00	per lb (nominal)
COCOA.—(nominal)	32·00 to 40·00	per cwt do
RICE.—Market very high & steady:—		
Kazla	R8·00 to 8·.0	per bag
Soolye	8·50 to 9·50	do
Callunda Scarce	9·00 to 9·50	
Coast Callunda	3·25 to 3·37	per bushel
Kuruve	3·20 to 3·30	do
Muttusamba	3·37 to 3·62	do

CINNAMON.—Quoted Nos. 1 to 4, at 66c and Nos. 1 and 2 at 70 cents per lb (nominal)

CHIPS.—R85·00 to 87·50

COCONUTS.—Ordinary	R35·00 to 40·00	per 1,000 (nominal)
do Selected	41·00 to 43·00	do do
COCONUT OIL.—	16·00 to 16·25	per cwt do
COPRA.—Market high & steady:—		
Kalpitiya	R49·00 to 50·00	per candy
Marawila	47·00 to 48·50	do
Cart Copra	42·00 to 45·00	do
POONAC.—Gingelly	85·00 to 90 00	per ton
Chekku	70·00 to 75 00	do
Mill (retail)	65·00 to 70·00	do
EBONY.—quotations at	R100 to R195	(nominal)
SATINWOOD.—cubic feet	2·00 to 2·25	do
HALMILLA.— do	1·25 to 1·50	do
KITUL FIBRE.—Quoted at R28·00		per cwt (nominal)
PALMYRA FIBRE.—Quoted nominally :—		
Jaffna Black.—Cleaned (Scarce)		
do Mixed	R18·50 to 19·00	per cwt.
Indian do	R7·00 to 9·00	do
Do Cleaned	10·00 to 14·00	
SAPAN WOOD.—Quoted	65·00 to 70·00	per ton
KEROSINE OIL—American	7·50 to 7·55	per case
* do Bulk Russian	2·67 to 2·72	per tin

* do 50,000 Cases Russian are being landed but price not fixed yet.

KAPOK.—Cleaned f.o.b :—	R29·00 to 30·00	per cwt
do Uncleaned (new)	7·50 to 8·00	do
Croton Seed	Scarce	do
Nux. Vnomica	2·50 to 3·00	do

CEYLON. EXPORTS AND DISTRIBUTION 1895-1896.

COUNTRIES.	Coffee cwt. Plantation	Coffee cwt. N'tive	Coffee cwt. Total.	Cinchona. 1896 B'nch & Trunk lb	Tea 1896 lb.	Tea 1895 lb.	Cocoa cwt.	C'moms lb.	Cinnamon. Bales lb.	Cinnamon. Chips lb.	Coconut Oil 1896 cwt.	Coconut Oil 1895 cwt.	P'bgo. 1896 cwt.
To United Kingdom ..	11483	142	11625	998926	75619750	68369026	23430	95103	792163	218792	68285	123678	93719
,, Austria	487	..	487	..	29861	3863	97	..	7400	83100	18470	18914	..
,, Belgium	27	..	27	..	30695	8113	127	2000	66700	71060	3209	3904	15349
,, France	459	..	459	6478	44971	32056	373	3000	57514	3500	114	404	2005
,, Germany	564	6	570	..	95573	199776	886	33013	433516	123172	14333	12779	31460
,, Holland	..	..	..	..	6120	11381	..	..	..	..	400	401	701
, Italy	20	..	20	5059	9730	7807	6	..	86200	82208	1813	706	364
,, Russia	124	20	144	..	224012	216580	..	..	..	.	81	..	21
,, Spain	..	..	..	..	46635	51275	..	..	189830	27720	208	101	..
,, Sweden	52	..	52	..	4925	750	..	..	299	112	402	..	195
,, Turkey	..	..	..	..	15505	7867	..	..	..	..	.	..	..
,, India	230	.	230	1379	749722	647129	2	137983	..	..	64961	4996	834
,, Australia	4447	564	5011	..	845096	7633559	76	..	9008	14168	1830	1983	3840
,, America	558	..	558	215037	461687	328616	436	2187	81800	..	51510	127998	130759
,, Africa	..	..	..	..	84590	95847	..	..	..	..	4	145	502
,, China	226	..	226	4480	265271	301531	..	200	77400	..	4277	475	..
,, Singapore	7	..	7	..	84446	27866	409	815	17000	500	32921	14 84	..
,, Mauritius	75	28	103	..	91810	139231	..	..	..	..	..	..	..
,, Malta	..	..	..	..	114250	78595	..	..	..	..	..	..	..
Total export from 1st Jan. to 27th Oct. 1896	18759	760	19519	1231359	86430522		25902	274301	1818830	624332	262818		279749
do 1895	55388	3781	59169	813577	79726659		23322	284310	1763864	641978	310168		257126
do 1894	24648	588	25236	2219688	69519831		16440	235411	1587509	475090	385616		279589
do 1893	45907	1964	47871	3098277	67280135		25238	281751	1407696	488100	292879		306659

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis & Peat's Fortnightly Prices Current, London, October 7th, 1896.)

	QUALITY.	QUOTATIONS.
ALOES, Soccotrine ...	Fair to fine dry ...	44s a 100s
Zanzibar & Hepatic	Common to good ...	15s a 76s
BEES' WAX,		
Zanzibar & (White...	Good to fine ...	£7 a £8
Bombay (Yellow...	Fair ..	£6 a £7
Mauritius & Madagascar..	Dark to good palish .	£6 5s a £6 15s
CAMPHOR, China ...	Fair average quality ...	125s
Japan ..	,, ,, nom...	135s
CARDAMOMS, Malabar..	Clipped bold, bright fine	1s 1d a 2s 8d
	Middling, stalky & lean	1s 5d a 1s 9d
Ceylon.—Mysore ...	Fair to fine plump ..	1s 8d a 3s 7d
	Seeds ...	2s 9d a 3s 1d
,, Tellicherry..	Good to fine ...	1s 8d a 2s
	Brownish ..	1s 3d a 1s 8d
,, Long ...	Shelly to good ...	1s 6d a 3s
,, Mangalore .	Med brown to good bold	2s 4d a 3s 6d
CASTOR OIL, Calcutta..	1sts and 2nds ..	2¾d a 3⅜d
Madras ...	..	2¾d
CHILLIES, Zanzibar ...	Dull to fine bright ..	30s a 45s
CINCHONA BARK.—		
Ceylon ...	Ledgeriana Chips ...	1d a 3½d
	Crown, Renewed ..	2d a 4½d
	Org. Stem	1¼d a 3d
	Hybrid Root ...	2¼d a 2½d
	Chip ...	1¼d a 2d
CINNAMON, Ceylon 1sts	Ordinary to fine quill...	10¼d a 1s 1d
2nds	,, ,, ...	9¾d a 1s
3rds	,, ,, ...	9½d a 11½d
4ths and 5ths	Woody and hard ..	8½d a 9½d
Chips	Fair to good ..	3d a 3⅜d
CLOVES, Penang ...	Dull to fine bright bold	6½d a 9½d
Amboyna ..	Dull to fine ...	3d a 4d
Zanzibar)	Good and fine bright .	2¼d a 2½d
and Pemba)	Common dull to fair ..	1⅞d a 2⅛d
Stems ..	Fair ..	⅞d
COCULUS INDICUS ...	Fair ..	7s 6d a 8s
COFFEE ...		
Ceylon Plantation	Bold to fine bold colory	110s a 118s
	Midding to fine mid .	103s a 108s
	Low mid. and low grown	97s a 101s
	Smalls ...	87s a 98s
Native ...	Good ordinary ...	35s a 75s
Liberian ...	Small to bold ...	70s a 80s
COCOA, Ceylon ..	Bold to fine bold ...	58s a 73s
	Medium and fair ...	55s a 62s
	Triage to ordinary ...	22s a 50s
COLOMBO ROOT... ...	Fair to good ..	20s a 27s
	Ord. & middling wormy	9s a 11s
COIR ROPE, Ceylon ...		nominal
Cochin ..	Ordinary to fair ..	£10 a £15
FIBRE, Brush ..	Ord. to fine long straight	£10 a £24
Cochin ...	Ordinary to good clean	£12 a £17
Stuffing ..	Common to fine ..	£5 a £6 10s
COIR YARN, Ceylon ..	Common to superior	£12 a £26 10s
Cochin ...	,, ,, very fine ...	£12 a £34
do. ..	Roping, fair to good ..	£11 10s a £15
CROTON SEEDS, sifted...	Fair to good ...	60s a 66s
CUTCH	Fair to fine dry ...	9s 3d
GINGER, Bengal, rough	Fair ...	13s
Calicut, Cut A	Good to fine bold ...	52s 6d a 83s
B & C	Small and medium ...	36s
Cochin Rough..	Common to fine bold ..	28s a 32s
	Small and D's ..	20s a 25s
Japan ..	Unsplit ...	15s a 16s 6d
GUM AMMONIACUM ...	Sm. blocky to fine clean	17s a 36s 6d
ANIMI, Zanzibar...	Picked fine pale in sorts	£10 7s 6d a £13
	Part yellow and mixed	£7 17/6 a £10 10s
	Bean and Pea size ditto	70s a £7 12/6
	Amber and dk. red bold	£4 5s a £9
	Med. & bold glassy sorts	90s a 137s 6d
Madagascar ...	Fair to good palish ..	£4 8s a £6 15s
	,, ,, red .	£5 a £7 5s
ARABIC E. I. & Aden ...	Ordinary to good pale	50s a 60s
Ghatti ..	Pickings to fine pale ..	25s a 60s
Kurrachee.	Good and fine pale ...	65s a 60s
	Reddish to pale selected	35s a 45s
Madras ...	Dark to fine pale ..	37s 6d a 45s
ASSAFŒTIDA ..	Clean fr. to gd. almonds	40s a 70s
	Ord. stony and blocky	15s a 35s
KINO ..	Fine bright ..	£20 a £25
MYRRH, picked ...	Fair to fine pale ...	30s a 90s
Aden sorts	Middling to good ..	33s a 65s
OLIBANUM, drop ..	Good to fine white ...	34s a 60s
	Middling to fair ..	20s a 31s
pickings	Low to good pale ...	7s a 15s
siftings	Slightly foul to fine ...	9s 6d a 14s
INDIARUBBER, Assam .	Good to fine ...	1s 10d a 2s 3½d
	Common to foul & mxd.	3d a 1s 6d
Rangoon ..	Fair to good clean ...	1s 1d a 1s 11½d
Borneo ...	Common to fine ..	1s a 1s 7d

	QUALITY.	QUOTATIONS
INDIARUBBER, *(Contd).*		
Java, Sing. & Penang	Foul to good clean ..	1s 3d a 2s 3d
Mozambique	Good to fine Ball ..	2s 2d a 2s 6d
	Ordinary to fair Ball	1s 2d a 2s 1¾d
	Low sandy Ball	10d a 1s 1d
	Sausage, fair to good	1s 4d a 2s 5½d
	Liver and livery Ball	1s 3½d a 2s 2½d
Madagascar	Fr. to fine pinky & white	1s 11¼d a 2s 5d
	Fair to good black ...	1s 3d a 1s 10d
	Niggers, low to good...	10¼d a 1s 6½d
INDIGO, E.I. ...	Bengal--	
	Shipping mid to gd violet	4s 6d a 5s 2d
	Consuming mid. to gd.	3s 9d a 4s 4d
	Ordinary to mid. good	2s 10d a 3s 8d
	Mid. to good Kurpah ..	2s 6d a 3s 3d
	Low to ordinary .	1s a 1s 6d
	Mid. to good Madras .	1s 4d a 2s 10d
MACE, Bombay, & Penang	Pale reddish to fine ..	1s 7d a 2s 4d
	Ordinary to fair ..	1s 2d a 1s 6d
	Chips and dark ..	1s
MYRABOLANES, Madras	Dark to fine pale UG ..	2s 6d a 4s 6d
	Fair Coast ..	4s
Bombay ..	Jubblepore ...	3s 9d a 6s
	Bhimlies ...	3s 9d a 7s
	Rhajpore, &c. ...	3s 6d a 5s 6d
Bengal ..	Calcutta ..	3s 6d a 5s 6d
NUTMEGS—	64's to 57's ..	3s a 3s 2d
Bombay & Penang	112's to 65's ...	1s 1d a 2s 11d
	160's to 130's ...	9d a 1s
NUTS, ARECA ...	Ordinary to fair fresh .	8s 6d a 12s 6d
NUX VOMICA, Bombay	Ordinary to middling...	4s 6d a 6s
Madras	Fair to good bold fresh .	6s a 7s 6d
	Small ordinary and fair	4s 6d a 7s
OIL OF ANISEED ...	Fair merchantable ...	92s 7½d
CASSIA ..	According to analysis..	4s 8d a 8s
LEMONGRASS ..	Good flavour & colour...	2¼d
NUTMEG ...	Dingy to white ...	3¼d a 4d
CINNAMON ...	Ordinary to fair sweet...	4d a 1s 3d
CITRONELLE ..	Bright & good flavour	1s 2d a 1s 9d
ORCHELLA WEED—		
Ceylon ..	Mid. to fine not woody .	11s a 15s
Zanzibar. ..	Picked clean flat leaf ..	10s a 20s
	,, wiry Mozambique	15s a 17s 6d
PEPPER—(Black)—		
Alleppee & Tellicherry	Fair to bold heavy ..	2¼d a 2½d
Singapore	Fair	2⅜d a 2 7-16d
Acheen & W. C. Penang	Dull to fine .	2d a 2⅜d
PLUMBAGO, lump ..	Fair to fine bright bold	15s a 17s 6d
	Middling to good small	3s 6d a 13s
chips ...	Dull to fine bright	1s 6d a 8s 9d
dust ...	Ordinary to fine bright	2s a 6s
SAFFLOWER ...	Good to fine pinky ...	85s a 90s
	Middling to fair ..	80s
	Inferior and pickings .	60s a 65s
SANDAL WOOD—		
Bombay, Logs	Fair to fine flavour ..	£30 a £50
Chips	... ...	5s a £3
Madras, Logs	Fair to good flavour ..	£30 a £50
Chips	Inferior to fine ..	£4 a £8
SAPAN WOOD, Bombay	Lean to good ...	£4 a £5
Madras	Good average ...	£4 a £5 nom.
Manila	(Rough & rooty to good	£4 10s a £5 15s
Siam	(bold smooth ...	£6 a £7
SEEDLAC ..	Ord. dusty to gd. soluble	70s a 95s
SENNA, Tinnevelly ..	Good to fine bold green	6d a 8d
	Fair middling medium	2¼d a 4½d
	Common dark and small	1d a 2d
SHELLS, M. o'PEARL--		
Bombay ..	Bold and A's	£4 15s a £5 2s 6d
	D's and B's	£4 10s a £4 15s 6
	Small	85s a 90s
Mussel ..	Small to bold ..	10s a 50s
TAMARINDS, Calcutta	Mid. to fine bl'k not stony	9s
Madras ...	Stony and inferior ..	6s a 7s
TORTOISESHELL –	Selected	51s
Zanzibar and Bombay	Small to bold dark ..	
	mottle part heavy ...	19s 6d a 24s 6d
TURMERIC, Bengal ..	Fair	7s 6d a 7s 9d
Madras ...	Finger fair to fine bold	11s 6d a 12s
Do.	Mixed midlng. [bright	9s 6d
Do.	Bulbs	7s 6d
Cochin ...	Finger	6s 6d a 7s 6d
	Bulbs	5s 6d a 7s 6d
VANILLOES—		
Mauritius and) 1sts	Gd. crysallized 4 a 9 in.	17s a 32s
Bourbon ...) 2nds	Foxy & reddish 4½ a 8 ,,	11s a 15s
3rds	Lean and inferior ..	7s a 10s
Seychelles	(Inferior to fine crys- tallized 3½ a 9 in.)	8s a 31s
VERMILION ...	Fine, pure, bright ...	2s 8d a 2s 9d

THE
AGRICULTURAL MAGAZINE,
COLOMBO.

Added as a Supplement Monthly to the "TROPICAL AGRICULTURIST."

The following pages include the Contents of the *Agricultural Magazine* for November :—

Vol. VIII.] NOVEMBER, 1896. [No. 5.

SEASON REPORT FOR SEPTEMBER.

W*ESTERN PROVINCE.*—Harvesting of Yala crop going on and preparation for Maha-Harvest prospects good. Fruits and vegetables scarce in Kalutara and Negombo. Vegetable supply good but fruit scarce in Colombo District. Rainfall fairly plentiful.

Central Province.—Yala crop being harvested, good or fair generally, but particularly good in Matale. Yala crop being sown or in early stages of growth. Prospect of dry grains good. Rainfall sufficient in most parts, good supply of fruits and vegetables in Newera Eliya.

Northern Province—The rain in the North was fairly well distributed, though very heavy in some parts. Paddy sowing commenced with the rains. A few cases of murrain reported from kilakumulai in Vavuniya District.

Southern Province.—Maha sowing going on. A good harvest was taken at Tissa. Rain abundant. A few cases of cattle disease.

Eastern Province. Ettala paddy crop in Batticaloa being harvested and yield good. Munmari crop being delayed for want of rain, but has progressed fairly in Trincomalee. Preparation for sowing Indian corn and fine grain in Batticaloa, Tobacco land being manured for next years crop in Trincomalee.

N. W. Province.—Yala crop gathered or being taken in, though slightly interfered with by rain in some parts. Preparation for Maha crop in progress. In Puttalam the rainfall was very scanty. Crop prospects good in Kurunegalle District. Murrain among cattle.

Province of Uva.—Maha harvest complete; crop good in all parts except Wellassa where damage was done to the paddy fields. Sowing for Yala going on. Fruits and vegetables scarce.

N. C. Province—Yala harvest still going on—reaping and threshing in progress. Tanks more or less half full, though some small tanks are dry. Health of cattle bad. Murrain in all palatas except Tamankaduwa and hoof and mouth disease general.

Province of Sabaragamuwa.—Yala crop being taken in, harvest good in Kegalle, fair in Ratnapura. Early Maha crops progressing satisfactorily. Dry grain prospects generally good. Cattle free from disease.

RAINFALL TAKEN AT THE SCHOOL OF AGRICULTURE DURING THE MONTH OF OCTOBER, 1896.

1	Thursday ..	3·02	19	Monday ..	1·45
2	Friday ..	·57	20	Tuesday ..	Nil
3	Saturday ..	1·52	21	Wednesday ..	Nil
4	Sunday ..	·91	22	Thursday ..	·65
5	Monday ..	Nil	23	Friday ..	Nil
6	Tuesday ..	1·48	24	Satuday ..	Nil
7	Wednesday ..	·83	25	Sunday ..	Nil
8	Thursday ..	Nil	26	Monday ..	·12
9	Friday ..	·13	27	Tuesday ..	·88
10	Saturday ..	·09	28	Wednesday ..	·80
11	Sunday ..	·27	29	Thursday ..	·55
12	Monday ..	1·11	30	Friday ..	·03
13	Tuesday ..	1·01	31	Saturday ..	·60
14	Wednesday ..	·39	1	Sunday ..	·57
15	Thursday ..	1·59			
16	Friday ..	·15		Total ..	16·57
17	Saturday ..	Nil		Mean ..	·53
18	Sunday ..	Nil			

Greatest amount of rainfall in any 24 hours—on the other 15th October, 1·96 inches.

Recorded by M. W. K. BANDARA,

IMPLEMENTS.

A catalogue of the various implements of husbandry used in Ceylon would not occupy much space, and the lack of variety cannot be said to be made up by efficiency. If it be argued that there is nothing that can supercede the so called native plough under certain conditions we are only too ready to admit the contention. But what we hold is that the native plough is not suited to all kinds of land, and its work can be done far better at certain times even on the land which it may be said to be best suited for. Not only are there various forms of ploughs used in modern agriculture—different ploughs for different kinds of land, but there are various forms of tillage implements other than the plough which are used at different stages in the preparation of land for sowing, so as to make that preparation as thorough as possible. Each of these distinct forms of tillage implements has its own special work and one cannot satisfactorily perform the work of the other. In native husbandry there is but one implement for animal power, a simple hoe or one-tined cultivator, for a plough it is not, since it has not the essential element of every plough, viz. the mould-board by which a furrow slice is turned-over. A cultivator is all very well in its place. Indeed it may be said to be indispensable for its special work, but to say that the plough can be superceded by the cultivator is absurd. The operation in native husbandry which is most akin to the work of a properly constructed plough, is the turning over of the sods as a first operation in preparing for sowing. This part of the work is done by manual labour, by means of the mamoty, and the work is no doubt as thorough as it can be and possibly superior in quality to that which would be done by a plough. We are aware that in paddy cultivation the conditions of culture are such as do not greatly favour the use of an iron mould-board plough. There are in fact certain situations of land where it would be impossible at any period to use such an implement, but these are only exceptional cases, and a light mould-board plough, weighing not more than 25 lb, so as to be within the power of village buffaloes to draw, is an implement that should be an acquisition to most cultivators.

The mistake that was made in the attempt to supercede the native plough for ploughing work was to introduce what was a novelty from England. The Howard "Cingalee" plough which was specially designed and constructed to meet the wants of the Ceylon paddy cultivator weighed about 50 lb. and cost over R20. It would have been the better plan to have endeavoured to improve the native implements of husbandry by slow degrees and so to gradually work out a perfect implement. Modern English ploughs have indeed been the outcome of such gradual evolution.

The idea of improving native implements is not a popular one, for the failure of the first attempt to improve the native plough has done much damage to the cause, just as the dismal failure of the Alfred model farm for a long time stood in the way of any attempts being made at dairy farming and stock breeding.

In India much good is resulting from presistent attention to the implement question. The implements now in use by our cultivators should as far possible be modified, and suitable forms of new implements and machines, as would tend to facilitate and improve their work should be introduced. The school of agriculture ought to be given the opportunity of working at the improvement of implements, and by trials with various forms of new implements and machines as are likely to suit local conditions, of ascertaining, which of them are best adapted to the needs of cultivators in Ceylon.

For ploughing up coconut and other lands under "dry" cultivation there is a great demand for light ploughs, and these arenow being locally manufactured: an advertisement in the present issue of the Magazine indicates how and at what cost these could be procured. We have had many enquiries about the "planet junior" hand implements (with fittings for various kinds of work) which have been in use at the School of Agriculture. The implements are the best of their kind, and we would refer those who are in want of these handy and useful machines to Messrs. W. H. Davies & Co., who are Agents for the manufacturers.

OCCATIONAL NOTES.

In the present issue will be found the first of a series of papers as the peculiarities of coconut cultivation in India. Most of the information given is taken from the Indian Gazetteers and reproduced in the Watt's Economic Products of India. We have sometimes had enquiries made as to the method of culture in India, and we have no doubt that the authentic information embodied in the account now reproduced will be acceptable to our readers, some of whom will no doubt be inclined to think that more than one of the methods in vogue in N.W. India are very peculiar indeed—at any rate quite unlike anything practised in Ceylon. In future issues we shall refer to the forms of cultivation in vogue in other parts of the Indian peninsula.

The shipment of Homco manure referred to in our last issue has arrived and trials of this fertilizer, which comes to us with such an excellent reputation, have already been begun. Those of our subscribers who may be anxious to give it a trial can have small supplies (of say ¼ cwt.) on application to the Superintendent School of Agriculture.

The students of the School of Forestry have gone on tour, for a practical course of instruction, in charge of Mr. Broun the chief conservator of forests. The tour will extend over a month, during which time the forests between Kurunegal'e and Dambool will be traversed, while it is expected that Galboda and Newera Eliya will also be included in the tour. We can only wish that the School of Agriculture was as fortunate as its sister institution in having provision made which will enable its students also to travel and so gain that practical acquaintance with Ceylon products as cultivated on a commercial scale, which is so necessary to complete their course of training.

PECULIARITIES OF COCONUT CULTIVATION IN INDIA.

1. Bombay.

The coconut palm would seem to be grown almost solely for the "toddy" it produces in the Bombay Presidency. With reference to the Kolaba district it is said that the coconut is the most liquor-yielding palm, and that the moist, sandy soil, brackish water and abundance of fish manure make its growth so vigorous that the yield of juice is much in excess of the wants of the district. The trees are grown within walled or hedged enclosures, sometimes entirely given to coconut palms, in other cases partly planted with mangoes, jack, betel-nut, and other fruit trees. Every garden has one or two wells, from which the trees are waterd by a Persian wheel. In starting a cocoa-nut garden, a bed is prepared, and in it, at the beginning of the rainy season, from twenty to forty large, ripe, unhusked nuts are planted 2 feet deep. The bed is kept soaked with water, and after from three to six months the nut begins to sprout. The seedlings are left undisturbed for two years. They are then, at the beginning of the rains, planted in sandy soil in rows about 18 ft. apart, and with a distance of about 15 ft. between the plants. For about a foot and a half round each plant the ground is hollowed 3 or 4 inches deep, and during the dry months the plants are watered daily or once in two days, and once or twice in the year, enriched with fish manure or with a mixture of salt and *nachni*. When nine years old the trees begin to yield nuts twice a year and sometimes thrice, 120 nuts being the yearly average yield from each tree. The trees are then ready to be tapped, each cocoa-palm, when ready for tapping is estimated to represent an average outlay of about R9. The coconut gardens are generally owned by high-caste Hindus, who let the trees to some rich Bhandàri who has agreed to supply the owner of the liquor-shops with fermented or distilled juice. The Bhandàri pays the owner of the garden R1 a month for every three trees. Of the Thana District it is stated that the seed-nuts are prepared in different ways, the best and oldest tree in the garden being set apart for growing seed-nuts. The nuts take from seven to twelve months to dry on the trees; when dry they are taken down, generally in April or May, or left to drop. When taken down they are either kept in the house for two or three months to let half of the water in the nut dry, or if, the fibrous outer shell is not dry, they are laid on the house-roof or tied to a tree to dry. After the nuts are dry they are sometimes thrown into a well and left there for three months when they sprout. If the nuts are left to drop from the tree, which is the usual practice in Bassein, they are either kept in the house for some time and then left to sprout in a well, or they are buried immediately after they have fallen. When the nuts are ready for planting they are buried either entirely or from one half or two thirds in sweet land, generally from 1 to 2 feet apart, and sometimes as close as 9 inches. A little grass, rice straw or dry plantain leaves are spread over the nuts to shade them. If white ants get at the nuts the grass is taken away, and some salt or saltish mud mixed with wood ashes and a second layer of earth is laid over the nuts.

Nuts are sometimes planted as late as August, but the regular season is from March to May, when, unless the ground is damp and their inner moisture is enough for their nourishment, the nuts want watering every second or third day until rain falls. The nuts begin to sprout from four to six months after they are planted, and when the seedlings are a year or eighteen months, or, what is better, two years old they are fit for planting. At Bassein the price of seedlings varies from 5d. for a one or one and a half year old seedling, to 6d. (4 annas) for a two year-old plant.

In planting them out the seedlings are set about six yards apart in the 2 feet deep holes, in which about $1\frac{1}{4}$ pounds of wood-ashes have been laid to keep off white-ants, and the garden must be very carefully fenced to keep off cattle. The plants are then watered every second day, if not every day, for the first year; every third day, if not every second day, for the second and third year, and every third day, if possible, for the fourth and fifth year. Watering is then generally stopped, though some Bassein gardeners go on watering grown trees every seventh or eighth day. For two years after they are planted out the young trees are shaded by palm leaves or by growing *mutheli* plantains. During the rains, from its fifth to its tenth year, a ditch is dug round the tree and its roots cut, and little sandbanks are raised round the tree to keep the rainswater from running off. In the ditch round the tree, 22 pounds of powdered dry fish manure is sprinkled and covered with earth, and watered if there is no rain at the time. Besides fish manure the palms get salt-mud covered with the leaves of the croton-oil plant (Croton Tiglium) and after five or six days with a layer of earth; or they get a mixture of cow-dung and wood-ashes covered with earth; or night soil, which on the whole is the best manure. Palms suffer from an insect named *bhonga* which gnaws the roots of the tree, and from the large black carpenter-bee which bores the spikes of its half-opened leaves. When a palm is suffering from the attacks of the *bhonga*, a dark red juice oozes from the trunk. When this is noticed, a hole 3 inches sq. is cut in the trunk from 4-6, feet above where the juice is coming out, and is filled with salt, which drives away or kills the insect. To get rid of the boring insect, it is either drawn out by the hand, or it is killed by pouring into the spike assafœtida water or salt water.

Another reference to the yield of the palm in the Bombay Pres. says. "A well-watered and manured tree, in good soil, begins to yield when it is five years old and in bad soil when it is eight or ten years old. A palm varies in height from 50 to 100 feet, and is in greatest vigour between the ages of twenty and forty. It continues to yield till it is eighty, and lives to be a hundred. A good tree yields 3 or 4 times a year, the average number of nuts being about 75." In the report of the Kathiawar district in the Bombay gazette there occurs a short but interesting account of the coconut. At Mahuva in 1875, 1500 acres were planted with 170,000 plants. At Khandera there is a garden with 7,000 palms, and there are about 2,000 at Bhavnager. A singular fact about the coconut palm is that it grows freely in solid limestone, provided a hole about $3\frac{1}{2}$ feet

deep and 3in diameter is cut in the rock and filled with mould. All the trees at Gopuate are planted in solid rock.

DR. HENRY TRIMEN F.R.S.

Dr. Trimen, whose sad death occurred on the 17th. October, was no mere botanical enthusiast as many were inclined to think, but a scientific worker, who made use of his special knowledge as far as in him lay for the advancement of the colony's welfare. Indeed it will be long before we find another official with so intimate an acquaintance with our tropical flora not only in its purely botanical, but also in its economic aspects. In classifying and describing the vegetable products of the Island whenever the necessity arose, Dr. Trimen's services were invaluable and he will be sadly missed whenever work of this description has to be done. Besides, as a botanical referee on local questions who is there with Dr. Trimen's experience, and whose authoritative decisions will be accepted? A close worker who allowed himself little recreation, Dr. Trimen was yet a social companion and courteous in the highest degree.

We had the pleasure of being associated with him in dealing with the Ceylon collections for the Imperial Institute in London, and saw something of his wonderful energy and thoroughness of work. Very shortly before his death we had occasion to consult him on a point connected with the teaching of botany, and we would refer to the matter here as being of interest to others. We wrote to the Doctor animadverting on the botanical classification of fruits as given in ordinary text books of botany, remarking how inadequate such a mode of classification was for tropical fruit, and giving examples which presented difficulties. Here is Dr. Trimen's reply, which, while it illustrates the desicive manner in which he was wont to state his opinion on botanical questions, shows at the same time the characteristic humour of his style and conversation:—

Dear,—

You are quite right about the classification of fruits in text books. I have denounced them for years. But as a fact, they may mostly be disregarded, being never employed by working botanist and usually invented for the delectation of the unhappy student. Most of those in the list you give are succulent and several truly "berries" but most would require special description, not falling under particular names. Some have special names: that of the pomegranate is called a "balaustion" in the books. Anybody is at liberty to call it so if he chooses, but he may just as well call it a pomegranate at once, as there is nothing else like it in structure.

You will find correct descriptions of our *native* fruits in my Flora.

Yours very truly,

Henry Trimen.

"NITRAGIN," OR THE USE OF PURE CULTIVATION BACTERIA FOR LEGUMINOUS CROPS.

The inquiry by Dr. Nobbe took three distinct lines:—

1. What the nature of the process was by which leguminous nodule-possessing plants were enabled to assimilate free atmospheric nitrogen.
2. How the working of the nondles manifested itself in soils of different degrees of richness in nitrogen.
3. Whether the bacteria originating from the nodules of different kinds of leguminous plants were all of one and the same kind, or if each group of leguminous plants had its particular nodule activity.

As to 1, Nobbe concluded that, like the green plant, the bacteria could not by themselves assimilate free nitrogen, but that they were gradually changed in the nodules to a particular form known as "bacteriods," and that it was by virtue of their network arrangement in the cells of the nodules, which presented the largest possible surface to the air, that they were enabled to absorb the free nitrogen of the cell-sap and render it assimilable by the plant.

In regard to the second point, Nobbe found that the working of the nodules attains its full efficiency only when the soluable soil-nitrogen was nearly used up. Accordingly, the more nitrogen that the soil contained capable for being taken up by the plant, the less was the difference between plants that had been inoculated and those that had not. As a consequence of this, quickly growing leguminous plants such as peas, vetches, and the like, that used up the nitrogen of the soil quickly, showed the influence of the inoculation much more rapidly than did clover, lathyrus, &c. In the end, however, the inoculated plants possessed an advantage in that the demands of leguminous plants for nitrogenous food are exceptionally high.

The third question is the one of most importance to us at the present time. Nobbe showed, by his experiments, that though the bacteria from the nodules of leguminous plants of different families were in outward appearance scarcely to be distinguished from one another, yet in their behaviour to plants they showed very marked differences. The bacteria from nodules of the pea, for instance, acted admirably when used for inoculating the pea plant, and also did somewhat less well when used for vetches (which are nearly related to the pea); but they did not do at all when used on clovers, serradella, robinia &c.

Similarly, bacteria from the nodules of red clover, robinia &c., would answer with those kinds of plants from which they originated, but had no action whatever on peas. From this, Nobbe drew the conclusion that every leguminous plant is most influenced by bacteria of its own kind, though bacteria of nearly related kinds can replace one another to a certain extent; but that bacteria from leguminous plants belonging to families widely separated from one another, either from no nodules at all or only small ones with no appreciable influence on the supply of nitrogenous nourishment.

No absolute distinction, however, could be drawn respecting the activity possessed by the bacteria of nodules of different families of leguminous plants. For it was one only of degree. Pure cultivations of unlike origin represented not special kinds but only adoptable forms; these were able in a weaker degree to enter into symbiosis with all the families; these were the *neutral* bacteria. If one such form entered a leguminous root and, while forming nodules in it, increased, its descendants would be influenced by the parent plant so energetically that they would only possess the full power of working in the case of leguminous families of the same kind, but they would loose it more or less for all others. On sowing, therefore, in any particular soil, nodules can only be formed with certainty when the neutral bacteria or the form of bacteria adopted for the particular kind of plant in question are present in sufficient quantity. If in a soil already exhausted more or less, by heavy leguminous cropping of its neutral bacteria, there be put in another leguminous plant which is not closely related to the previous one, there will no longer be the conditions present for the formation of nodules, or else this formation will be so meagre that it has but little value for the nitrogenous nourishment of the plant. Hence, wherever there are no nodule-bacteria in soils, or these are present only in small quantity, the lacking bacteria should be artificially supplied by inoculation of the soil through the medium of the proper "Nitragin" for the crop in question.

In preparing "Nitragin" for commercial use, Nobbe and Hiltner took the "pure cultivation" obtained as already described, transferred it, with suitable precautions, to a glass bottle holding 8 to 10 oz., and containing at the bottom a small quantity of agar-gelatine on which it was then allowed to grow; the bottle was sealed and the contents kept from the light. In this form the "Nitragin", is available for use, and can now be purchased by anyone desirous of trying it.

MILK AND MILK PRODUCTS.

(By Mr. James Mollison),

Superintendent Government Farms, Bombay.

Milk sours so quickly in India that in order to get fresh cream the use of a De Laval Separator becomes almost compulsory. The separator will be found economical in other ways. By means of a separator the milk, so soon as it is milked, can be separated into its two products—cream and separated milk. The latter soon sours, but the former must be kept to ripen before it can be made into good butter. The separation of whole milk by mechanical power makes a large dairy unnecessary, for no room is required for the numerous vessels otherwise needed for setting the milk. If it is found necessary to raise cream by the ordinary milk-setting process in India, the quicker the cream is made to rise the better the results will be; because even under the most favourable conditions it is improbable that all the cream can be skimmed off before the milk has thickened by turning sour. The loss can be avoided if the milk is maintained at an artificially low temperature by means of ice. Cream rises quickest in a falling temperature, and to expedite the process on practical lines in India I should recommend that shallow vessels be used, that these be placed in pans containing the coolest well water procurable, or that water be cooled specially for the purpose by allowing it to filter through a series of earthenware chatties. It is well enough known that if porous earthenware vessels are placed on a stand one above the other so that the water passes from one to the other, even though the temperature of the atmosphere is high, evaporation takes place which lowers the temperature of the water so that, that which collects in the lowest vessel is comparatively cool and is ordinarily of sufficiently low temperature to rapidly lower the temperature of new milk, provided the milk is set in its vessel in the water. This is a cheaper method of rapidly cooling milk than the use of ice. There is however one objection. If milk is cooled below the temperature of the surrounding air, it will (like any other cold substance) condense the moisture of the surrounding air and along with this moisture it will absorb any taint or odour existing in that atmosphere. Impure air under these conditions will certainly injure milk. The point therefore to be sure of is that the dairy is thoroughly ventilated and that the air which circulates through it is pure. If on the other hand milk at a comparatively high temperature is exposed to air of a lower temperature the latter will certainly be the absorbent. These statements tend to show that the refrigerator in common use in dairies is of great value. The refrigerator is designed to aerate milk and at the same time to cool it. The refrigerator is essentially a continuous tube ranged like a "worm" inside a frame. Cold water is made to circulate through the continuous tube whilst the milk passes as a thin firm over the metal frame; the milk is cooled and at the same time is throughly exposed to the atmosphere so that the animal odour which invariably impregnates new milk is driven off. It is at the same time thoroughly exposed to the oxidizing influence of pure air. This refrigerating process is employed to prepare milk for conveyance by road or rail in closed vessels to considerable distances and the milk is undoubtedly all the better for the treatment.

I have found that in hot weather milk so treated is further preserved against any fermentative change if the vessels are covered with hoods of wet canvas. The heat of the sun or of the air evaporates the water from the hood and the heat necessary for volatilization of water is derived partly from the milk which is of course further cooled.

A cool well ventilated dairy kept scrupulously clean is as necessary in India as elsewhere. A well planned and well arranged dairy should, in India, have high walls with a considerable air space between the ceiling and the double tiled roof. Either a cement concrete floor or a stone floor does very well, but the joints of the latter should be well cemented. The walls also should be plastered with cement to a height of three or four feet or tiled, and there should be no underground drain. Milk must necessarily be spilled from time to time on the dairy floor, and if there are crevices in the floor or walls, small

quantities of milk are sure to enter and ferment and cause unsanitary conditions which should be avoided. The windows and doors of the dairy should face the west or north. The main walls should be of considerable thickness and a verandah all round will still further help to keep the dairy cool. If the windows open inwards and wire gauze is stetched upon and tacked to the window frame, ventilation will be secured whilst flies and other insects will be excluded.

SOME PARTICULARS REGARDING RHEA-CULTIVATION.

[Being extracts from a report to the Government of India by James Montgomery Esq. Kangra]

Propogation.

(1) By seed: This course must be adopted in some cases, when the germ of the plants has to be carried over great distances; but probably much disappointment will attend the result. To obtain the seed great care is requisite, and a favourable atmospheric season. For this purpose young spring shoots should be carefully reserved in a well sheltered position. These plants should receive special care and be well manured. During the rainy season they must be kept throughly drained, and after that has passed, the ground should be carefully loosened round the plants. If the rains cease early in October, a fair amount of seed may be obtained; but, as far as I can judge, no amount of care can ensure success, so much depending on the season a dry one being most favourable for the full development of the seed. The only method of sowing, which I found successful was on a gentle hot-bed under glass, in March and April; the seed scattered over the surface, covered very thinly with sifted earth, and carefully shaded from the sun, until the plants were about three inches high, when sunlight may be gradually admitted. When sufficiently strong they should be planted out a foot apart everyway.

(2) By cuttings of the stems: The stems should be spring-grown ones, allowed to ripen well and not cut until duly ripe. Then divide the ripened portion of the stem where the cuticle has turned fully brown into short lengths, each including three eyes or buds, cut a quarter of an inch below the bottom bud and as much above the top one, and plant with the centre bud level with the surface. If the weather be damp and cloudy, they will readily strike root, otherwise they will require shading for a week or ten-days, the soil being kept moist. As with seedlings, I find a foot apart everyway the most advantageous distance as very few shoots are thrown up the first year.

(3) By divisions of the roots: This is by far the most advantageous and profitable method. The plants for this purpose should be three or four years old. After gathering the spring crop, dig out each plant, carefully and remove the earth from the roots. I generally put the mass of roots into running water for a short time; this cleanses then thoroughly and enables the gardener to see his work clearly. The tuberous portions of the roots will be found to show a large number of eyes similar to those on a potato. From these carefully separate portions, each containing five or six eyes; let the cuts be clean and reject all fibrous and decayed matter. Expose these sets to the sun for a couple of hours to dry the surface of the wounds, and then plant six inches deep, and at the full distance of four feet apart every ways. In this way two good crops will be obtained from them the first year.

The soil and situation for plantations.—A rich loan suits the plants best, but they will grow in any kind of soil, provided a full suppiy of moisture be available, combined with through drainage. The latter is emergently required, particularly during the rainy season, as should the land be retentive and become swampy the plants will shortly decay in a very short period. If the land be poor, a liberal supply of manure is requisite, otherwise the stems will be short and weak, yielding scarcely any fibre. In no part of Upper India can the plant be successfully cultivated unless water for irrigation be available during the dry season. The facilities for obtaining an ample supply of water, combined with the moderate temperature at all seasons, renders this district particularly favourable to the plant.

Cultivation.—Should the land have been stocked with seedlings or cuttings (paragraphs 4 and 5), then in the following spring, after having reaped the first crop of available shoots, every other plant should be transferred to fresh ground, and put down at two feet apart. The following year the same course should be pursued, taking up each alternate root and replanting at four feet apart. After this the plants may well remain undisturbed for four years, hoeing well between after each crop, clearing away weeds, irrigating moderately during the dry season, and supplying manure where necessary. The only manure I had at command has been vegetable, consisting mainly of the leaves and wood portion of the plant itself, and of tree and vegetable leaves, stored up for the purpose, with which I mix a considerable amount of wood-ashes. With the aid of this only I have kept plants growing in the same spot for upwards of six years; but consequent on the then very crowded state of the ground, the stems were short and very weak. I would therefore recommend a thorough removal after four years, the land to be then well ploughed, cleaned and manured.

Gathering the Crop.—The period of reaping will vary slightly according to difference of season. I find that in this district three good crops can be relied on each year;—the first during the latter half of April, the second about the commencement of August; and the third about the end of November. It will be found of much advantage to postpone reaping the second and particularly the third, as long as the condition of the plants will admit. If the third crop be cut in the middle of November, the weather here during the remainder of that month is not sufficiently cold to keep back the new growth; and should the young shoots appear above ground early in January, the forests which are usual at that period seriously injure them and lessen the spring crop. My own experience indicate that the stems should be gathered so soon as the cuticle shows a clear brown colour for about one third of the length. At this stage, if the soil be good and the plant healthy, the

stems will be clean from butt to point, the leaves of a rich dark green above, and pearly white below, and the branch-buds, at the axil of each leap-stalk just showing. If gathered earlier than this I find the connection of the fibres very weak, and that a considerable portion separates in the operation of scraping the peel. If allowed a further growth, the axillary branches will have been thrown out, which will cause breakages at every point both in peeling and cleaning.

The average height of stems grown here has been six feet, after cutting off the soft portion at the top. In gathering I supply each coolie with a sharp pruning knife. With this they cut the ripe stems close to the butt; these are removed in bundles by boys to the nearest manure pit. Here the boys cut off nine inches of the top and pass one hand with a gentle pressure from top to butt; this removes every leaves. The stems are then placed in clean water from whence the peelers remove them and separate the peel, which is again thrown into water, from which it is withdrawn as wanted by the men who clean it. These lay three or four strips of peal on a flat board, scrape it a few times on the inner side from butt to point, then turn it over and repeat the scraping, which removes the cuticle: it is then hung up or thrown on clean grass to dry.

Taking the distance of four feet apart for fully bearing plants, an acre will contain (allowing for paths and water channels) 3000 plants: more than this I find to be too crowded and to increase labour while lessening the actual yield during a four year's period. Thus planted the yield will be a steadily increasing one, and the plants will not show any deterioration.

From repeated experimental weighings, I have deduced the following average proceeds from 1,000 freshly cut 6 feet stems:—

		lb.
Weights as cut	.. ..	286
do	when dried ..	.. 77·5=27 p.c
do	Fresh peel ..	.. 83 =29 „
do	Dry peel ..	.. 21·5=7·5 „
do	Fresh wood..	.. 203=71 „
do	Dry wood ..	.. 56 =19·5 „
do	Clean dry fibre	.. 18·7=6·5 „
do	Water ..	.. 208·5=73 „

If larger stems, from 7 to 8 feet, be taken, the average is less in the weight of peel, but in the outturn of clean fibre it is slightly greater. With small stems from three to four feet, the percentage of peel is markedly greater, but the return of fibre is barely 35 per cent. Moreover, the extra labour in cutting, peeling, and cleaning these small stems is an important consideration.

The crop cut during the rainy season will always contain a large percentage of water, and that of clean fibre be formed rather less, the fibre being also softer than at the other periods of cutting. This I consider due to the fact that at this period the resinous matter in the plant is in a more diluted state, and consequently a greater portion of it is removed during the process of washing and scraping the peel.

I have already expressed my opinion against the use of either immature or small stems as likely to give a result inferior both in quality and quantity; yet I am fully satisfied as to the advisability of not only sorting the crop, as cut, according to length of stem when necessary, but I would further recommend, that the peel from all stems of five feet and upwards should be divided into two, and the fibre from the upper and lower portions kept distinct. If cultivated as I suggest, the difference in length of the stems at each cutting will be found very small, the monsoon crop always giving the longest stems.

Taking the above as a basis for calculation and knowing that each plant established as I recommend will give at least an average of six stems during the first year, I assume:

$$\frac{3{,}000 \text{ plants} \times 6 \text{ stems} \times 3 \text{ crops} \times 18 \text{ lb.}}{1{,}000} = 972 \text{ lb.}$$

per acre per annum

In earlier estimates, calculating on closely—planted crops and stems four to five feet, I was cautious to restrict my estimate to 750 lb. per acre, but five years' additional experience has shown me that with proper open cultivation 1,000 lb. per acre may be fairly assured.

THE NUTRITIVE PROCESS IN PLANTS.

(Prof. J. Reynolds Green, D.Sc., F.R.S.)

Carbohydrate reserve materials are not always deposited in the shape of starch grains The roots of our biennial plants furnish as with examples of another kind of store. If we examine the root of a beet or a mangel wurzel we find that the succulent substance is distinctly sweet to the tastes. This sweetness is due to the presence of a solution of cane sugar in the sap. The cells are very turgid with water, and this contains a large percentage of cane sugar Indeed, the manufacture of sugar for the market from beet-root is, as is wellknown, of great commercial importance. The sugar here remains in solution, and is not deposited as starch as in the former case. We cannot however, think of it as remaining unchanged after its transit from the leaves. The process of its formation is much like that of the potato at first. But when the leaf starch has been converted into sugar, that sugar is malt sugar as before, and it is transformed into cane sugar after its arrival in the root.

An onion affords us an instance of yet another kind of carbohydrate deposit. Here the fleshy leaves of the bulb, wrapping it so closely round as to form a very solid body, are charged with an accumulation of grape sugar, a third kind, differing from both malt sugar and cane sugar, such as we have seen to occur during the processes already described.

The chief form of deposit in seeds is that of starch, which is the most stable body and the least liable to disturbance. This no doubt is why it is adopted by the plant for this reservoir, as generally a longer time, indeed in some cases a very prolonged period, passes before it is called upon to supply nourishment to the young plants. Carbohydrate material is thus stored in many forms and in various places in the plant. Similarly, nitrogenous material or proteid has its appropriate reservoirs. We have in many seeds, particularly leguminous ones, stores of

this material in the form of definite granular aggregations, which botanists have called *aleurone grains.* If we take for instance the pea or bean, we see that the cells contain embedded in their protoplasm structural elements of two sizes. The larger shows the curious concentric marking peculiar to starch, the smaller show no structure. Instead of turning blue when treated with iodine, they become brown or brownish-yellow. These small grains are the aleurone grains, and are made of proteid. This substance is not all uinform in its properties, indeed, we are familar with many k.inds of proteids, which differ very considerably with regard to the fluids in which they will dissolve. Those proteids which most readily occur to our memory are the albumin or white of egg, the globulin of muscle, the fibrin of blood and so on. Though the vegetable proteids are not met with in the same condition exactly as the animal ones they are nevertheless very much like them in their composition. The aleurone grains of the pea have very striking similarities with the globulin found in muscle. A good deal of the substance is soluble, like that, in a ten per cent. solution of common salt, and salt added to saturation to such a solution of the protied precipitates it in the form of an amorphous mass. Parts of some aleurone grains are soluble in water, and resemble some of the soluble proteid, of an animal digestion. The albumin of white of egg is very much like a proteid which is found on the undergrnond parts of the asparagus, which must be accordingly called a vegetable albumin.

If we wish to study the deposition of proteids in these vegetable reservoirs, we turn to the seeds rather than to other parts of the plant. In seeds they are very common. The pea and bean have been alluded to; here they occur in conjunction with starch. Other seeds, such as the rape and the linseed, show them associated with oil. In some seeds they are distributed through the whole substance of the embryo; in others they fill the endosperm; in the wheat and barley they occupy a single layer of cells just underneath the outer covering.

In most of the seeds produced by our cultivated plants, the aleurone grains are very simple in structure; indeed they show no structure, being little rounded masses of granular-looking material. In some foreign seeds, particularly the seeds of the castor oil and the Brazil nut, they are much more complicated. In our own flax we have similar ones. Various solvents need to be used to show the structure, which consists of the following parts. There is an oval casing or matrix, part of which dissolves in water, and the rest in 10 per cent solution of common salt. Embedded in it is a large regular crystal of proteid matter, which will only dissolve in a saturated solution of salt This is known as the crystalloid. Between this and the outside of the grain is a rounded irregular mass of small crystals of the double phosphate of magnesium and calcuim, which is known as the globoid. This of course is not proteid though it is always embedded in the grain.

RAPE.

A correspondent to the Ceylon "Observer," has made some enquiries about the cultivation of rape.

In England two forms of rape are distinguished (1) Winter rape (Coleseed) Brassica napus, and Summer rape (Colza) B. Campestris. The latter matures faster, though they are both biennial crops. Rape may be said to grow on all soils but best on clay fen or alluvial soils: peaty land suits it very well. The summer rape, however, likes a heavy clay best. The crop grows very rapidly and is ready for eating off as fodder in 12 to 14 weeks. The seed is best drilled 12 to 15 in apart, 4 to 6 lb. being required for one acre. It is said that there is no crop on which sheep feed faster and do better than rape. The leaves are rather liable to attack by fly, and a remedy against this is dusting over with lime, ashes, soot or salt. The seed crop yields from 24 to 36 bushels per acre. Rape seed contains 35 to 40 % of oil. The residue or cake is good for feeding though much inferior to linseed cake. In spite of it being rather bitter to the taste, stock do not dislike it. When mustard seed is found along with rape the cake is only fit for manure for which it is valuable as containing nitrogen in a slowly available condition. Mustard seed commonly occurs with India rape seed which is therefore quite unsuitable for feeding purposes. To detect the presence of mustard in rape mix the cake with cold water and leave in a covered vessel: a characteristic smell is soon perceived. Generally rape is first fed and then allowed to seed. On the continent it is commongly grown for green manuring or ploughing its herbage into the soil. Rape oil is extensively used for machinery, lamps &c., but the oil and cake so called are not exclusively obtained from this oil nor are the name Colza oil and rape oil used to distinguish the produce of different plants. The seeds of other cruciferous plants are also crushed with rape and Colza. In particularly rich soils rape sometimes grows to a height of 3 or 4 feet.

In the "characteristics and composition of feeding stuffs" given in the H. and A. Society's Journal we read of Rape seed (seed of Brassica napus and campestris):

"It has a greenish mottled apearance and a bitter taste which renders it distasteful to cattle at first. Should be given in small quantities to begin with. Not suited for calves. When given to milch cows the quantity should not exceed 2 or 3 lb. per head per day, or it will give a disagreeable taste to milk and butter. Sometimes very impure. A dangerous impurity is mustard seed. May be detected by steeping in cold water for some hours and noting smell of mustard. Danger may be avoided by steeping the ground Cake in *boiling* water."

The average composition of pure rape cake is given as "albuminoids 31, oil 10, and carbohydrates 30 per cent." Rape is a good deal cultivated in India. In our next we shall refer to the special features of rape cultivation in India.

REPORT OF THE SUPERINTENDENT OF SCHOOL OF AGRICULTURE FOR 1895.

(*To be continued.*)

Model Farm.

The subjoined statement shows the transactions of the Model Farm for the past year. The lease of this Crown land was acquired from a private individual, who had been holding it on payment, (out of the Dairy funds,) of a sum of Rs. 4,400 as compensation. A rental of Rs. 1,350 a year is paid to Government for the occupation of the land, and any profits that may accrue after this obligation is fullfilled goes to the credit of the Dairy Fund.

In August Mr. Samaranayaka, an Assistant Master at the School of Agriculture, was detached for service at the Model Farm, where he was to take up his residence in order to better look after the interest of the farm and remain in charge of such of the dairy cattle as might be sent there from time to time. Mr. Samaranayaka, has had on an average about 25 head of cattle under his care at a time, the stock consisting chiefly of dry cows and growing calves. The main source of revenue from the farm is the land under Mauritius grass, and since Mr. Samaranayaka has taken charge of the place better returns than before have been shown.

Grass Land about Dairy.

These lands which supply the dairy cattle with the bulk of their green fodder, the value of which is debited to the dairy, yielded a net return of Rs. 750 during the year.

The financial position of the dairy will be seen at a glance in the following summary:—

	Rs. c.
Vote from Government in 1893 ...	19,539 12
Special advance in 1894 ...	11,500 0
	31,039 12
Paid in 1893 to revenue ...	7,627 86
Paid in 1894	1,262 65
Paid in 1895	5,237 35
Balance to be paid	16,911 26
	31,039 12
Balance in hand on December 31, 1895, ...	R3,114·44
Valuation of stock, building, and utensils, ...	R15,500

There has been some outcry against the expenditure on the work of the School of Agriculture. If, as I gather from the last Administration Report of the Director, the annual cost of the Agricultural School proper is between Rs. 8,000 and Rs. 9,000, it must be remembered that there is a considerable revenue from its appertinent institutions—the Dairy and Model Farms. The net profits from these establishments were in 1895 (a bad year for the dairy) over Rs. 6,000. In a good working year, when the profits of the dairy should be nearly double what they were last year, and with the agricultural students paying double the fees they have paid hitherto (a measure which came into force from January, 1896), the expenditure on all the establishments under my charge would be practically met by the revenue.

Experimental Cultivation.

An experiment in grape cultivation was begun at the School of Agriculture by arrangement made with Signor Zanetti, an Italian gentleman, who has had considerable experience in viticulture in Italy and Australia. Nearly an acre of land in the vicinity of the dairy was laid under vines in August, and the plants—720 in number—are being treated after the Continental fashion. The following are the varieties of grapes that are receiving a trial: Gordo Blanco, Lady's Finger, Champion Muscat, Gross Colman, Snow Muscat Marllion (white grapes), Black Prince, Black Ambro (black grapes), and Chassalas d'Or (a golden grape). It is too early to speak definitely with regard to the vineyard at the school, but so far the vines have made fair progress under the system they have been grown, despite the poor soil in which they have been planted and the severe drought they experienced during the latter part of the year. There is yet much to be done in the way of modifying their treatment to suit local conditions, which Signor Zanetti is gradually doing after studying the progress of the plants.

Trials were also made with teosinte or reana *(Enchlana Luxurians)*, "Delft" grass *(Andropogon Schoenanthus)*, and different varieties of the cow pea. Teosinte and Delft grass were of course grown only as fodder plants. The yield of the former was at the rate of 15 tons per acre per cutting, or, if five full cuttings could be counted upon in the year, the enormous annual yield of 75 tons per acre. It should be stated, however, that the soil on which the teosinte was grown was a rich black mould. On a poor sand the crop made little growth without manure, and was almost killed out during the dry season.

Delft grass, said to be the prevalent grass on the island of Delft off the northern coast, also proved to be a heavy cropper, yielding at the rate of 8 tons 4 cwt. per acre per cutting; and four or five cuttings a year may be counted upon.

Unfortunately your cattle did not take at all to this grass, objecting apparently to the strong anisescent of the leaves. Delft grass is a close ally of the wild grasses used for haymaking in Western India, and ought to be well suited for that purpose, only that Ceylon stock do not take to hay at all. Even the imported Sind cattle will not touch hay after having eaten Mauritius grass for a time.

Of cow peas, the most satisfactory variety proved to be that know as "the wonderful.". Its yield, when grown for fodder, was at the rate of 5½ tons per acre; and cattle took very kindly both to this and to teosinte grass. The legumes are good for human food, and though a little coarse found purchasers. The cow pea is, however, best known as a nitrogen restoring crop, and since I established the plant at the school I have had many applications for seed, while considerable interest has been evinced by our more advanced agriculturists in the question of the assimilation of free introgen by certain plants and the important bearing it has on practical argiculture. The study of this question from a local standpoint will no doubt bring out some useful facts. The school has formed further connections with agricultural institutions in India and the Colonies, and the agricultural Magazine continues to be a valuable medium of local and foreign communication.

C. DRIEBERG, B.A., F.H.AS.,
Superintendent.

Statement showing the receipts, Cost of Maintenance, and Profit of the Government Dairy

Farm during the year 1895.

Date. 1895.	Receipts.	Amount. Rs. c.
January ...	Realized by sale of milk, manure, &c., ...	1,628 39
February ...	Do. ...	1,465 68
March ...	Do. ...	1,272 74
April ...	Do ...	1,153 89
May ...	Do. ...	1,310 80
June ...	Do. ...	1,329 62
July ...	Do. ...	1,429 17
August ...	Do. ...	1,458 13
September ...	Do. ...	1,380 58
October ...	Do. ...	1,371 75
November ...	Do. ...	1,436 62
December ...	Do. ...	1,513 32
		16,750 69

Payments.	Amount. Rs. c.
Paid to the Manager as salary (January to December)	480 0
Paid to twelve coolies as salary (January to December)	1,440 0
Expended in transporting milk to Hendala	165 0
Expended in feeding cows for the year	10,883 17
Expended in medicines and disinfectants	112 15
Expended in oil	61 48
Expended in baskets, brooms, ropes, &c.	31 60
Expended in stamps	6 20
Expended in repairs to building and utensils	49 0
Expended in the milk purchased ...	1,369 59
Net profit on dairy produce ...	2,161 50
	16,750 69

Model Farm Account, 1895.

Receipts.	Rs. c.
Total receipts for the year	3,000 86
	3,000 86

Expenditure.	Rs c.
Working expenses for the year ...	639 88
Rent paid to Government ...	1,350 0
Net profit	1,010 98
	3,000 86

GENERAL ITEMS.

"Mulch," says the American Agriculturist, "keeps the ground loose and porous, and this causes the moisture in the ground below to be drawn upwards towards the surface. This is especially important in hot dry weather, for at such a time a plant can hardly have too much moisture. How can a large field be mulched? By repeated cultivation. The light coating of soil on the top acts very much as does a regular mulch of straw or leaves, helping plants wonderfully in withstanding drought. Moreover, the stirring of the soil destroys all weedgrowth........Farmers, as a rule, do not do half enough in the way of cultivating their crops when growing. Let them try thorough tillage for one season, and they will be surprised and delighted with the results."

Labour-saving machines used in the preparation of the land and cultivation of crops is one of the chief features in the Agriculture of today. While deep cultivation and subsoilng are of special value in a large proportion of soils, shallow or top-cultivation is not only useful but it becomes in all hot and dry countries imperative for the growth of crops in all kinds of soils. Keeping a fine layer of soil on the surface of the ground does more than anything else to keep and economise the moisture in the soil. It acts as a mulch, and this is the easiest and cheapest form in which it can be provided....... Soil having been once cultivated to a good depth by ploughing and subsoiling, it does not require to be constantly turned over with a plough, but what it needs is the constant stirring and pulverising of the surface. For this purpose several very effective implements have been invented, which like the old fashioned harrow will cultivate a much larger surface with the same strength of team as would be required for ploughing. On some soils and in some seasons rolling is found very beneficial as it tends to compact the soil......Some of these surface cultivating machines act as weeders, while nearly all have the power of producing on the surface finely pulverised soil, which acts as a mulch and prevents the evaporation of moisture from the land.

The following, considered an excellent remedy for sore eyes appears in the Cape Agricultural journal:

Sulphate of Zinc, *three drachms,* Liquid Extract of Opium, *three ounces,* to be mixed in *twelve ounces* of rain water.

One ounce of the mixture to half a pint of water; of this two ounces to be syringed (a small glass syringe is best) into the eye.

A correspondent writes: I have used the above for two seasons and find it an unfailing remedy. This season out of thirty head treated, only two or three required a second application. If possible, keep the affected beast (with me mostly young cattle) separte from the herd as it is very contagious.

Referring to Banana or Plantain meal, the *Produce world* says:

The best meal is reported to be made when the fruit is green: just before it ripens. It should be peeled, and then cut into slices—if to be dried in the sun the thinner the better. Steel knives should not be used, silver or nickel are the best; but substitutes may be made of ivory, bone, or even bamboo. After cutting up, the slices may be spread out on a cloth in the sun to dry, or the fruit may be dried in special ovens. When thoroughly dry the slices are ground or pounded into meal or flour, then sifted through a fine sieve, and all particles of fibre or foreign matter removed.

If the fruit is partially ripe it will not dry well; the dry portions will be of a dark colour, and spoil the *quality* of the flour.

Mr. J. W. Crowhurst and F.R.C.V.S. states that in treating warts, particularly when very small and in great numbers, he has found arsenic in the form of Fowler's solution, produce good results. The dose given to cattle is about one tablespoonful once or twice a day for 10 or 15 days.

Mr. Long in answer to Mr. Ascroft stated in the House of Commons that there were 10,753,000 Cattle and 29,775,000 sheep in the United Kingdom at the date of the last return. No official estimate of their value exists, but if £ 9 per head in the case of cattle, and £ 1 per head in the case of sheep be taken as a fair average, the value of the cattle would be nearly £ 97,000,000 and that of the shee[p] 30,000,000.